



**JADAVPUR UNIVERSITY  
KOLKATA – 700032**

**APPLICATION FORM FOR PROMOTION OF UNIVERSITY TEACHERS UNDER CAREER ADVANCEMENT SCHEME**

(Submit hardcopies and a softcopy in CD)

**From:**

**Stage/Designation STAGE 3 / ASSISTANT PROFESSOR**

**To:**

**Stage/Designation STAGE 4 / ASSOCIATE PROFESSOR**

(Assistant Professor Stage 1 to Stage 2, Stage 2 to Stage 3), Assistant Professor (Stage 3) to Associate Professor (Stage 4), Associate Professor (Stage 4 ) to Professor/equivalent cadres (Stage 5).

**PART A : GENERAL INFORMATION AND ACADEMIC BACKGROUND**

1.	Name (in Block Letters):	KETOSETUO KUOTSU					
2.	Father's Name/Mother's Name:	LATE RHEZELHOU KUOTSU					
3.	Date of Birth:	16 <sup>th</sup> June 1979					
4.	Category: Please tick (✓) in appropriate box.	<input type="checkbox"/> SC	<input checked="" type="checkbox"/> ST	<input type="checkbox"/> V	<input type="checkbox"/> OBC-A	<input type="checkbox"/> OBC-B	<input type="checkbox"/> GEN
5.	Department/School:	PHARMACEUTICAL TECHNOLOGY					
6.	Current Designation & Academic Grade Pay(AGP):	ASSISTANT PROFESSOR (STAGE 3), AGP: 8000/-					
7.	Date of last Promotion, if any:	16.05.2017					
8.	Date of eligibility for promotion:	15.05.2020					
9.	Address for correspondence(with pin code):	DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY JADAVPUR UNIVERSITY, KOLKATA 700032					
	Permanent Address (with pin code):	H. NO. 480, BELOW MEZHIR HIGHER SECONDARY SCHOOL, LOWER MIDLAND, KOHIMA, NAGALAND - 797001					
11.	Telephone No.:	+91 8981099151					
12.	E-mail Id:	ketousetuo@yahoo.co.in					

*All information provided here should duly be supported by documentary proof.*

**13. Academic Qualifications:**

<b>A. Last Academic Qualification (other than research degree(s)):</b>					
Degree/ Certificate	Name of The Board/ University	Year of Passing	Percentage of Marks Obtained	Division/ Class/Grade	Subject (s)
B. PHARM.	DIBRUGARH UNIVERSITY	2002	67.9	1 <sup>ST</sup> CLASS WITH HONOURS (2 <sup>ND</sup> RANK IN DU)	PHARMACEUTICS, PHARMACOGNOSY, PHARMACOLOGY, MICROBIOLOGY, BIOCHEMISTRY, PHARMACEUTICAL CHEMISTRY, PHARMACEUTICAL ENNGINEERING
M. PHARM.	JADAVPUR UNIVERSITY	2004	73.33	1 <sup>ST</sup> CLASS	PHARMACEUTICS, PHARMACOGNOSY, PHARMACOLOGY,

<b>B. Research Degrees:</b>			
Degree	Title of Dissertation/Thesis	Date of Award	Name of the University
Ph. D. / D. Phil.	DEVELOPMENT AND EVALUATION OF MUCOADHESIVE NASAL DRUG DELIVERY SYSTEMS OF OXYTOCIN	08/02/2008	JADAVPUR UNIVERSITY

**14. Position(s) held Prior to Joining this University, if any:**

Designati on	Name of Employer	Date of		Gross salary with AGP	Reason for Leaving
		Joining	Leaving		
Research Scientist	Macleods Pharmaceuticals LTD	01.08.2007	12.05.2008	Rs. 27,084	Opportunity to join Jadavpur University as Lecturer

**15. Posts held after Appointment at the University:**

Designation	Department/School	Period		Pay Scale/Academic Grade Pay (AGP)
		From	To	
Assistant Professor Stage 1	JADAVPUR UNIVERSITY	16/05/2008	15.05.2012	RS. 15600-39100 AGP: 6000
Assistant Professor Stage 2	JADAVPUR UNIVERSITY	16/05/2008	15.05.2017	RS. 15600-39100 AGP: 7000
Assistant Professor Stage 3	JADAVPUR UNIVERSITY	16/05/2008	Till date	RS. 15600-39100 AGP: 8000

**16. Period of Teaching and/ or Research Experience:**

Level of Classes	No. of Years
PG Classes	12
UG Classes	12

**17. Field(s) of Specialisation under the Subject/ Discipline:**

- (a) Pharmaceutical Jurisprudence
- (b) Pharmaceutics
- (c) Clinical Pharmacy
- (d) Industrial Pharmacy
- (e) Pharmaceutical Technology

**18. Orientation/ Refresher Course(s) Attended:**

Title of the Course	Place	Duration (No. of Weeks)	Period
REFRESHERS COURSE ENTITLED, "PROGRESS IN PHARMACEUTICAL RESEARCH AND TECHNOLOGY" OF QIP UNDER THE AUSPICES A.I.C.T.E., NEW DELHI	JADAVPUR UNIVERSITY	4 WEEKS	18 <sup>th</sup> AUGUST 2008 TO 13 <sup>th</sup> SEPTEMBER 2008.
REFRESHERS COURSE ENTITLED, "THRUST AREAS ON DEVELOPMENT OF NATURAL PRODUCTS" OF QIP UNDER U.G.C., NEW DELHI.	JADAVPUR UNIVERSITY	4 WEEKS	20 <sup>th</sup> NOVEMBER 2008 TO 10 <sup>th</sup> DECEMBER 2008.
13 <sup>th</sup> ORIENTATION PROGRAMME UNDER U.G.C., NEW DELHI	NORTH EASTERN HILL UNIVERSITY	4 WEEKS	16 <sup>th</sup> FEBRUARY 2011 TO 15 <sup>th</sup> MARCH 2011.
WORKSHOP ON MOOCs,E-CONTENT DEVELOPMENT AND OPEN EDUCATIONAL RESOURCES	JADAVPUR UNIVERSITY	2 WEEKS	19 <sup>th</sup> DECEMBER 2019 TO 02 <sup>nd</sup> JANUARY 2020

**PART B: ACADEMIC PERFORMANCE INDICATORS**

*Please see details of API scoring points for each category in Guidelines.*

*All information provided in the API based PBAS proforma must be supported by documentary proof and Document Tag No. against the relevant indicator.*

**111CATEGORY : I. TEACHING, LEARNING AND EVALUATION RELATED ACTIVITIES**

Sl. No.	Nature of Activity Max	Hours spent per academic year	Actual score	Self Appraisal Score following the formula of "Actual score"	Verified API Score (for Office Use Only)	Supporting Document Tag No. (1, 2, 3,...)
1.	Direct Teaching (self declaration) <b>70</b>	700	Hours spent per academic year ÷ 7.75	90.32 (As per class routine)	<b>70</b>	Tag 1
2.	Examination duties (question paper setting, Invigilation, evaluation of answer scripts etc.) <b>20</b> (self declaration)	250	Hours spent per academic year ÷ 10	25 (As per exam routine allotment)	<b>20</b>	Tag 2
3.	Innovative Teaching – learning methodologies, updating of subject contents/courses, mentoring etc. (self declaration)	10	Hours spent per academic year ÷ 10	25 Powerpoint presentation, using different scientific videos (to demonstrate principles, methodologies instrumentation, animal studies, etc)	<b>10</b>	Tag 3
<b>Total API:</b> <b>100</b>				140.32	<b>100 per year</b>	

**CATEGORY-II: CO-CURRICULAR, EXTENSION AND PROFESSIONAL DEVELOPMENT RELATED ACTIVITIES**

Sl. No.	Nature of Activity	Hours spent per academic year	Actual score	Self Appraisal Score following the formula of "Actual score"	Verified API Score (for Office Use Only)	Supporting Document Tag No. (1, 2, 3,...)
1.	Student related co-curricular, extension and field based activities  (i) Discipline related co-curricular activities (e.g. remedial classes, career counseling, study visit, student seminar and other events.) (ii) Other co-curricular activities (Cultural, Sports, NSS, NCC etc.) Extension and dissemination	250	Hours spent per academic year ÷ 10	25	<b>15 per year</b>	Tag 4

	activities (public /popular lectures/talks/seminars etc.) (self declaration with examples)					
2.	Contribution to corporate life and management of the department and institution through participation in academic and administrative committees and responsibilities. i). Administrative responsibility (including as Dean / Principal / Chairperson / Convener / Teacher-in- charge/similar other duties that require regular office hrs for its discharge) (ii). Participation in Board of Studies, Academic and Administrative Committees (self declaration with examples)	300	Hours spent per academic year ÷10	30	15 per year	Tag 5
3.	Professional Development activities (such as participation in seminars, conferences, short term training courses, industrial experience, talks, lectures in refreshers/faculty development courses, dissemination and general articles and any other contribution) (self declaration with examples)	150	Hours spent per academic year ÷10	15	15 per year	Tag 6
<b>Total API:</b>					<b>3 x 45 = 135 per assessment period</b>	Type text here

### CATEGORY-III: RESEARCH AND (RELATED) ACADEMIC CONTRIBUTIONS

Category	Activity	Engineering/ Sciences/ Medical Sciences	Faculties of Languages/ Arts/ Humanities/ Social Sciences//Management	API score Allotted *	Self- Appraisal Score (to be submitted by the applicant)	Verified API Score (for office use only)	Supporting Document Tag No. (1, 2, 3, ...)
III (A): Research Papers	Research Papers published in:	Refereed Journals as notified by the UGC	Refereed Journals as notified by the UGC	As provided in Clarification :(A)			
IF 1.992	1. Suraj Sharma, Sweet Naskar, Ketousetuo Kuotsu Metronomic chemotherapy of carboplatin-loaded PEGylated MWCNTs: Synthesis, characterization and in-vitro toxicity in human breast cancer. <b>Carbon Letters</b> , 30, 435-447, 2020  2. Arijit Guha, Md. Adil Shaharyar, Kazi Asraf Ali, Sanjit Kr. Roy, Ketousetuo Kuotsu Smart and Intelligent Stimuli Responsive Materials: An Innovative Step in Drug Delivery System. <b>Current Biochemical Engineering</b> , 6, 41-52, 2020			1.992+10 =11.992	(25+10)*0.35= 12.25	P 75	

	3.	Saumen Karan, Souvik Debnath, Ketousetuo Kuotsu, Tapan Kumar Chatterjee <i>In-vitro</i> and <i>in-vivo</i> evaluation of polymeric microsphere formulation for colon targeted delivery of 5-fluorouracil using biocompatible natural gum katira <b>International Journal of Biological Macromolecules</b> , 158, 922-936, 2020	$5.16+20=25.16$ $(25+20)*0.15=6.75$	P 77
IF 5.162	4.	Suraj Sharma, Sweet Naskar, Ketousetuo Kuotsu A review on carbon nanotubes: Influencing toxicity and emerging carrier for platinum based cytotoxic drug application <b>J. Drug Deliv. Sci. Technol.</b> , 51, 708-720, 2019.	$(25+15)*0.35=14$ $2.73+15=17.73$	Tag - 10 P78
IF 2.734	5.	Sweet Naskar, Suraj Sharma, Ketousetuo Kuotsu A smart gelatin nanoparticle for delivery of metoprolol succinate: A strategy for enhancing the therapeutic efficacy by improving bioavailability. <b>J. Drug Deliv. Sci. Technol.</b> , 53, 101214, 2019	$(25+15)*.35=14$ $2.73+15=17.73$	Tag - 11 P79
IF 2.734	6.	Sweet Naskar, Suraj Sharma, Ketousetuo Kuotsu Chitosan-based nanoparticles: An overview of biomedical applications and its preparation. <b>J. Drug Deliv. Sci. Technol.</b> , 49, 66-81, 2019	$(25+15)*0.35=14$ $2.73+15=17.73$	Tag - 12 P80
IF 2.734	7.	Sweet Naskar, Ketousetuo Kuotsu, Suraj Sharma Chitosan-based nanoparticles as drug delivery systems: a review on two decades of research. <b>J. Drug Target</b> , 27, 379-393, 2019	$(25+15)*0.35=14$ $3.38+15=18.38$	Tag - 13 P81
IF 3.380	8.	Radharani Panda, Ketousetuo Kuotsu Fabrication, Characterization, And In Vitro Evaluation Of Pegylated Glyceride Labrasol® Nanostructured Lipid Carrier Composites Of Methotrexate: The Pathway To Effective Cancer Therapy. <b>Asian Journal of Pharmaceutical and Clinical Research</b> , 12, 229-237, 2019	-	Tag - 14
IF 3.380	9.	Radharani Panda, Ketousetuo Kuotsu Strategies in overcoming the challenges of cytotoxic agents using smart colloidal solid lipid nanoparticles and nanostructured lipid carriers - A review <b>Asian Journal of Pharmacy and Pharmacology</b> , 5, 643-659, 2019	-	Tag - 15
IF 2.401	10.	Nikhil Biswas, Ketousetuo Kuotsu Chronotherapeutically Modulated Pulsatile System of Valsartan Nanocrystals-an <i>In Vitro In Vivo</i> Evaluation. <b>AAPS Pharm. Sci. Tech.</b> , 18, 349-357, 2017	$(25+15)*0.5=20$ $2.4+15=17.4$	Tag - 16
IF 7.097	11.	Ranjan Ku Sahoo, Nikhil Biswas, Arijit Guha, Nityananda Sahoo, Ketousetuo Kuotsu Development and <i>in vitro/in vivo</i> evaluation of controlled release provesicles of a nateglinide-maltodextrin complex. <b>Acta Pharmaceutica Sinica B</b> , 4, 349-357, 2014 X	$7.1+20=\cancel{27.1}$	Tag - 17 P85
IF 7.097	12.	Arijit Guha, Nikhil Biswas, Kaustav Bhattacharjee, Piu Das, Ketousetuo Kuotsu <i>In Vitro</i> Evaluation of pH Responsive Doxazosin Loaded Mesoporous Silica Nanoparticles: A Smart Approach in Drug Delivery. <b>Current Drug Delivery</b> , 13, 574-, 581, 2016 X	$1.58+10=\cancel{11.58}$	Tag - 18
IF 7.097	13.	Arijit Guha, Nikhil Biswas, Kaustav Bhattacharjee, Nityananda Sahoo, Ketousetuo Kuotsu pH responsive cylindrical MSN for oral delivery of insulin-design, fabrication and evaluation. <b>Drug Delivery</b> , 23, 3552-3561, 2016 X	$4.9+15=\cancel{19.9}$	Tag - 19
IF 7.097	14.	Nikhil Biswas, Arijit Guha, Ranjan Kumar Sahoo, Ketousetuo Kuotsu Pulse release of doxazosin from hydroxyethylcellulose compression coated tablet: mechanistic and <i>in vivo</i> study. <b>International Journal of Biological Macromolecules</b> , 72, 537- 543, 2015 X	$5.16+20=25.16$	Tag - 20
IF 7.097	15.	Nityananda Sahoo, Ranjan Ku Sahoo, Nikhil Biswas, Arijit Guha, Ketousetuo Kuotsu Recent advancement of gelatin nanoparticles in drug and vaccine delivery. <b>International Journal of Biological Macromolecules</b> , 81, 317-331, 2015 X	$5.16+20=25.16$	Tag - 21
IF 7.097	16.	Ranjan Ku Sahoo, Nikhil Biswas, Arijit Guha, Nityananda Sahoo,		

	<p>Ketousetuo Kuotsu Nonionic surfactant vesicles in ocular delivery: innovative approaches and perspectives. <b>BioMed Research International</b>, 1-12, 2014 <math>\times</math></p> <p>17. Ranjan Ku Sahoo, Nikhil Biswas, Arijit Guha, Ketousetuo Kuotsu Maltodextrin based proniosomes of nateglinide: bioavailability assessment. <b>International Journal of Biological Macromolecules</b>, 69, 430-434, 2014 <math>\times</math></p> <p>18. Nikhil Biswas, Ranjan Kumar Sahoo, Arijit Guha, Ketousetuo Kuotsu Chronotherapeutic delivery of hydroxypropylmethylcellulose based mini-tablets: an in vitro-in vivo correlation. <b>International Journal of Biological Macromolecules</b>, 66, 179-185, 2014 <math>\times</math></p> <p>19. Y.P. Bharitkar, S. Bathini1, D. Ojha, S. Ghosh, H. Mukherjee, Ketousetuo Kuotsu, D. Chattopadhyay, N.B. Mondal. Antibacterial and antiviral evaluation of sulfonoquinovosyldiacylglyceride: a glycolipid isolated from Azadirachtaindica leaves, <b>Letters in Applied Microbiology</b>, 58, 84-189, 2014 <math>\times</math></p> <p>20. Y. P. Bharitkar, M. Banerjee, S. Kumar, R. Paria, R. Medha, Ketousetuo Kuotsu, N. B. Mondal. Search for potent microbicidal spermicide from the isolates of Shorearobusta resin. <b>Contraception</b>. 88, 133-140, 2013 <math>\times</math></p> <p>21. Sweet Naskar, Sanjit Kr. Roy and Ketousetuo Kuotsu, Drug delivery based on Buccal Adhesive systems - a review, <b>International Journal of Pharma and Bio Sciences</b>, 4(3), 240-256, 2013 <math>\times</math></p> <p>22. Asim Sattwa Mandal, Sugata Chatterjee, Subhasis Kundu, Nikhil Biswas, Arijit Guha, Sreyashi Paul, Ketousetuo Kuotsu. In vitro-in vivo correlation and bioavailability studies of captopril from novel controlled release donut shaped tablet. <b>International Journal of Pharmaceutics</b>. 421, 145-150, 2011 <math>\times</math></p> <p>23. Asim Sattwa Mandal, Sugata Chatterjee, Kazi Masud mKarim, Nikhil Biswas, Arijit Guha, Mamata Behera, and Ketousetuo Kuotsu. Fabrication and in vitro evaluation of bidirectional release and stability studies of mucoadhesive donut-shaped captopril tablets. <b>Drug Development and Industrial Pharmacy</b>. 38, 706-717, 2011 <math>\times</math></p> <p>24. Kazi Masud Karim, Asim Sattwa Mandal, Nikhil Biswas, Arijit Guha, Sugata Chatterjee, Mamata Behera, Ketousetuo Kuotsu. Niosome: A Future of Targeted Drug Delivery Systems. <b>Journal of Advanced Pharmaceutical Technology &amp; Research</b>.1, 374-380, 2010 <math>\times</math></p> <p>25. Asim Sattwa Mandal, Nikhil Biswas, Kazi Masud Karim, Arijit Guha, Sugata Chatterjee, Mamata Behera and Ketousetuo Kuotsu Drug delivery system based on chronobiology – A review. <b>Journal of Controlled Release</b>. 147, 314-325, 2010 <math>\times</math></p> <p>26. Ketousetuo Kuotsu, Amal Kumar Badyopadhyay Development of Oxytocin nasal gel using natural mucoadhesive agent obtained from the fruits of <i>Dellinia indica</i>. <b>Science Asia</b>, 33, 57-60, 2007 <math>\times</math></p> <p>27. Yajaman Sudhakar, Ketousetuo Kuotsu, Amal Kumar Bandyopadhyay Review paper Buccal Bioadhesive Drug Delivery - A Promising Option For Orally Less Efficient Drugs. <b>Journal of Controlled Release</b>. 114, 15-40, 2006 <math>\times</math></p>	<p><math>2.58+15=17.58</math> <math>\times</math></p> <p><math>5.16+20=25.16</math> <math>\times</math></p> <p><math>5.16+20=25.16</math> <math>\times</math></p> <p><math>2.1+15=17.17</math> <math>\times</math></p> <p><math>2.81+15=17.81</math> <math>\times</math></p> <p>-</p> <p><math>4.84+15=19.84</math> <math>\times</math></p> <p><math>2.36+15=17.36</math> <math>\times</math></p> <p>-</p> <p><math>7.72+20=27.72</math> <math>\times</math></p> <p><math>0.425+5=5.425</math> <math>\times</math></p> <p><math>7.72+20=27.72</math> <math>\times</math></p>	<p>Tag – 22</p> <p>Tag – 23</p> <p>Tag – 24</p> <p>Tag – 25</p> <p>Tag – 26</p> <p>Tag – 27</p> <p>Tag – 28</p> <p>Tag – 29</p> <p>Tag – 30</p> <p>Tag – 31</p> <p>Tag – 32</p> <p>Tag - 33</p>
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<b>III (B): Books/</b>				
<b>III (B): Books/</b>	Activity	Engineering/ Sciences/ Medical Sciences	Faculties of Languages/ Arts/ Humanities/ Social Sciences/Management	API score Allotted *

Book chapters / Referring of journal papers		Medical Sciences	Sciences/Management				
	Publications of books	Text/Reference/Relevant Books published by International Publishers, with ISBN/ISSN number	Text/Reference/Relevant Books published by International Publishers, with ISBN/ISSN number	30 per Book for Single Author			
	Sl. No., Details of Book						
	Activity	Engineering/ Sciences/ Medical Sciences	Faculties of Languages/ Arts/ Humanities/ Social Sciences/Management	API score Allotted			
	Publications of books	Subject/ Relevant Books, published by National level publishers, with ISBN/ISSN number or State/Central Govt. Publications	Subject / Relevant Books, published by National level publishers, with ISBN/ISSN number or State/Central Govt. Publications	20 per Book for Single Author			
	Sl. No., Details of Book						
	Activity	Engineering/	Faculties of Languages/	API score			

		Sciences/ Medical Sciences	Arts/ Humanities/ Social Sciences/Management	Allotted			
Publications of books	Subject/ Relevant Books, published by other local publishers, with ISBN/ISSN number	Subject/ Relevant Books, published by other local publishers, with ISBN/ISSN number	15 per Book for Single Author				
Sl. No., Details of Book							
Activity	Engineering/ Sciences/ Medical Sciences	Faculties of Languages/ Arts/ Humanities/ Social Sciences/Management	API score Allotted				
Publications of book chapters	Chapters in Books, published by National and International level publishers, with ISBN/ISSN number, Conf. Proc. with ISBN/ISSN number	Chapters in Books, published by National and International level publishers, with ISBN/ISSN number, Conf. Proc. with ISBN/ISSN number	International-10 per Chapter National – 5 per Chapter				
Sl. No., Details of Book chapters 1. Circadian Rhythms: Biology, Cognition and Disorders (ISBN -10: 161324858X)					X		Tag - 34
Activity	Engineering/ Sciences/ Medical Sciences	Faculties of Languages/ Arts/ Humanities/ Social Sciences/Management	API score Allotted				
Referring of Journal Papers	Referring of Journal Papers from UGC list	Referring of Journal Papers from UGC list	5/ Journal paper				
Sl. No., Details of Journal paper I had been awarded the Certificate of reviewing the following Journals a. Colloids and Surfaces A: Physicochemical and Engineering Aspects, 2019 b. Journal of Drug Delivery Science and Technology, 2018 c. International Journal of Biological Macromolecules, 2015					05 05 X	5 + 5 = 10	Tag - 35 Tag - 36 Tag - 37

III(C): RESEARC H PROJECT S	Activity	Engineering/ Sciences/ Medical Sciences	Faculties of Languages/ Arts/ Humanities/ Social Sciences/Management	API score Allotted
	Sponsored Projects:	Major Projects with grants above Rs. 30 lakhs	Major Projects with grants above Rs. 5 lakhs	20 per Project
List of project titles, funding agency, amount mobilized and period along with proof is to be enclosed.				
	1. MESOPOROUS SILICA NANOPARTICLES FOR CONTROLLED RELEASE OF INSULIN - DESIGN, FABRICATION AND EVALUATION, INDIAN COUNCIL OF MEDICAL RESEARCH. Rs. 23,28,850/-, 2011 – 2014. 		15	Tag – 38
	2. PROGRAMMED POLYMERIC DEVICE FOR PULSED DELIVERY: AN APPROACH IN THE MANAGEMENT OF HYPERTENSION USING ANTIHYPERTENSIVE AGENT AS MODEL DRUG, COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH. Rs. 11,34,000/-, 2011 - 2015. 		15	Tag – 39
	3. DESIGN AND EVALUATION OF MULTIPARTICULATE TIME PROGRAMMED EXPLOSION SYSTEM FOR PULSED RELEASE: AN APPROACH IN THE MANAGEMENT OF EARLY MORNING SURGE IN BLOOD PRESSURE, DEPARTMENT OF SCIENCE AND TECHNOLOGY, Rs. 19,55,000/- 2012 – 2015. 		15	Tag – 40
	4. DEVELOPMENT, CHARACTERIZATION AND EVALUATION OF VALACYCLOVIR – LOADED NANOPARTICLES, UNIVERSITY GRANTS COMMISSION, Rs. 6,71,500/-, 2012 – 2015. 		15	Tag – 41
	5. DESIGN, DEVELOPMENT AND EVALUATION OF ORAL NOVEL MUCOADHESIVE DONUT SHAPED CAPTOPRIL TABLETS. ALL INDIA COUNCIL FOR TECHNICAL EDUCATION. RS. 5,22,000/-, 2010-2012. 		15	Tag – 42
	6. DESIGN, DEVELOPMENT & CHARACTERIZATION OF COLON TARGETTED ORAL ANTICANCER DRUG DELIVERY SYSTEM, MODULATION WITH POLY – L – LYSINE. RUSA 2.0, RS 19,74,113/- 		15	Tag – 43
			15	15
	Activity	Engineering/ Sciences/ Medical Sciences	Faculties of Languages/ Arts/ Humanities/ Social Sciences/Management	API score Allotted
	Sponsored Projects:	Major Projects with grants above Rs. 5 lakhs up to Rs. 30 lakhs	Major Projects with grants above Rs. 3 lakhs up to Rs. 5 lakhs	15 per project
List of project titles, funding agency, amount mobilized and period along with proof is				

	to be enclosed.					
Activity	Engineering/ Sciences/ Medical Sciences	Faculties of Languages/ Arts/ Humanities/ Social Sciences/Management	API score Allotted			
Sponsored Projects:	Minor Project with grants above Rs. 1 lakh up to Rs.5 lakhs	Minor Project with grants above Rs. 0.5 lakh up to Rs. 3 lakhs	10 per project			
List of project titles, funding agency, amount mobilized and period along with proof is to be enclosed.						
Activity	Engineering/ Sciences/ Medical Sciences	Faculties of Languages/ Arts/ Humanities/ Social Sciences/Management	API score Allotted			
Consultancy Projects	Amount mobilized with a minimum of Rs. 10 lakhs	Amount mobilized with a minimum of Rs. 2 lakhs	10 for every Rs. 10 lakhs and Rs. 2 lakhs			
List of project titles, consultancy grantee, amount mobilized and period along with proof is to be enclosed.						
Activity	Engineering/ Sciences/ Medical Sciences	Faculties of Languages/ Arts/ Humanities/ Social Sciences/Management	API score Allotted			
Projects Outcome / Outputs	Patent/Technology transfer / Product / Process	Major Policy document prepared for international bodies like WHO/UNO/UNESCO/UNI CEF etc. Central State Govt./Local Bodies	30 for each International/20 for each national level output or patent. Major policy document			

			of International bodies – 30 Central Government – 20, State Govt.- 10 Local bodies – 5			
	List of projects, patents, policy documents with agencies - proof is to be enclosed.					
III(D): RESEA RCH GUIDAN CE	Degree	Engineering/ Sciences/ Medical Sciences	Faculties of Languages/ Arts/ Humanities/ Social Sciences/Management	API score Allotted		
	M.Phil.	Degree awarded	Degree awarded	5 per candidate		
	List of candidates having Sl. No., Name and Year of Degree Awarded duly authenticated by appropriate authority is to be enclosed as supporting document.				22X5=110  X No MPhil	0
	Degree	Engineering/ Sciences/ Medical Sciences	Faculties of Languages/ Arts/ Humanities/ Social Sciences/Management	API score Allotted		
	Ph.D.	Degree awarded / Thesis submitted / Registered	Degree awarded / Thesis submitted/ Registered	15/10 / 5 per candidate		
	List of candidates having Sl. No., Name and Year of Degree Awarded duly authenticated by appropriate authority is to be enclosed as supporting document.				X 15X7=105 ✓ 10X1=10 X 5X3=15	15 10
	Only those after 2017 can be credited					Tag -45 Tag - 46 Tag - 47
III(E): Fellowsh ips,	Activity	Engineering/ Sciences/ Medical Sciences	Faculties of Languages/ Arts/ Humanities/ Social Sciences/Management	API score Allotted		

Awards and Invited lectures delivered in conferences / seminars	Fellowships/Awards	International Award/Fellowship from academic bodies	International Award/Fellowship from academic bodies / Associations	15 per award / 15 per Fellowship			
	List of Fellowships/Awards with sponsoring agency and the year of award along with documentary proof is to be enclosed.						
	Activity	Engineering/ Sciences/ Medical Sciences	Faculties of Languages/ Arts/ Humanities/ Social Sciences/Management	API score Allotted			
	Fellowships/ Awards	National Award/Fellowship from academic bodies	National Award/Fellowship from academic bodies / Associations	10 per award / 10 per Fellowship			
	List of Fellowships/Awards with sponsoring agency and the year of award along with documentary proof is to be enclosed.						
	Activity	Engineering/ Sciences/ Medical Sciences	Faculties of Languages/ Arts/ Humanities/ Social Sciences/Management	API score Allotted			
	Fellowships/ Awards	State/University level award from academic bodies	State/University level award from academic bodies / Associations	5 per award			
	List of Fellowships/Awards with sponsoring agency and the year of award along with documentary proof is to be enclosed.						

Activity	Engineering/ Sciences/ Medical Sciences	Faculties of Languages/ Arts/ Humanities/ Social Sciences/Management	API score Allotted		
Invited lectures/ papers	International	International	7 per lecture /5 per paper presented		
List of lectures/papers with Title with details - documentary proof is to be enclosed				5X4=20	
	X	In three caes, the presenter is different			Tag -48 Tag - 49 Tag - 50 Tag - 51
	X			5	
Activity	Engineering/ Sciences/ Medical Sciences	Faculties of Languages/ Arts/ Humanities/ Social Sciences/Management	API score Allotted		
Invited lectures/ papers	National level	National level	5 per lecture/3 per paper presented		
List of lectures/papers with Title with details - documentary proof is to be enclosed				3X1=3	
		Presenter is different		X	0
					Tag - 52
Activity	Engineering/ Sciences/ Medical Sciences	Faculties of Languages/ Arts/ Humanities/ Social Sciences/Management	API score Allotted		
Invited lectures/ papers	State/University level	State/University level	3 per lecture/2 per paper presented		
List of lectures/papers with Title with details - documentary proof is to be enclosed					
<i>The score under the sub-category 'Invited lectures/ papers' shall be restricted to 20% of the minimum fixed for Category III for any assessment period</i>					
Activity		API score Allotted			
Development of e-learning delivery process/material	10 per module				
List of e-learning materials along with documentary proof to be enclosed					

Total API of Category III:			
----------------------------	--	--	--

\* If the Research Paper is published in the Refereed Journals as notified by UGC, other reputed journals as notified by UGC and other reputed journals as identified by the University for a specific subject, API will be calculated as per following rules:

Clarification (A): If the Research paper is published in the Refereed Journals as notified by UGC, the API will be calculated in the following manner:

25 + API coming from Impact factor augmentation (paper with impact factor less than 1 - by 5 points; papers with impact factor between 1 and 2 by 10 points; papers with impact factor between 2 and 5 by 15 points; papers with impact factor between 5 and 10 by 20 points; papers with impact factor above 10 by 25 points)

For joint publications, API coming from Impact factor augmentation will be calculated like this: Of the total score for the relevant category of publication by the concerned teacher, the First and Principal / corresponding author /supervisor / mentor would share equally 70% of the total points and the remaining 30% would be shared equally by all other authors.

Clarification (B): If the Research Paper is published in other reputed journals as notified by UGC and other subject specific reputed journals as identified by the University, author will get 10 for each publication.

#### IV. SUMMARY OF API SCORES

Sl. No.	Category	Criteria	API Score for the Assessment period (16.05.2017..) 15.05.2020
1.	Category - I	Teaching- learning, Evaluation Related Activities	140.32 100 per year
2.	Category - II	Professional Development and Extension activities	70 $3 \times 45 = 135$ per assessment period
3.	Category - III	Research and Academic Contributions	808.92 150 per assessment period
Total API score of Category - II + Category - III *		878.92	285 per assessment period

\* Teachers may score the balance of points from either Category II or Category III to achieve the minimum score required under Category II + III.

#### PART C: OTHER RELEVANT INFORMATION

*Please give details of any other significant contributions not included above. All information provided here should be supported by documentary proof.*

Sl. No.	Details (Mention year, value, etc., where relevant)

#### PART D: PUBLICATION REQUIREMENTS

Sl. No.	Stage / Designation	Minimum no. of Publications required and period allowed for meeting such requirements
1.	Assistant Professor (Stage 3) to Associate Professor (Stage 4)	At least three publications in the entire period as Assistant Professor (Twelve years)
2.	Associate Professor (Stage 4) to Professor (Stage 5)	A minimum of five publications since the period that the teacher is placed in stage 3

Sl. No.	Publication Details	Document Tag No.

**LIST OF ENCLOSURES: (Please attach, documentary proofs including copies of certificates, sanction orders, papers, etc. wherever necessary)**

A/1.	Age verification certificate
A/2.	Last month salary slip
A/3.	Assistant Professor Stage 1 to Stage 2
A/4.	Assistant Professor Stage 2 to Stage 3
A/5.	Schedule Tribe Certificate
A/6.	Marksheet of Class X
A/7.	Marksheet of Class XII
A/8.	B. Pharm Marksheets
A/9.	B. Pharm Pass Certificate
A/10.	GATE -2002 Scorecard (Pharmacy)
A/11.	M. Pharm Marksheets
A/12.	M. Pharm Pass Certificate
A/13.	Ph. D Certificate (Pharmaceutics)
A/14.	Macleods Pharmaceutical Pvt. Ltd. appointment letter
A/15.	Macleods Pharmaceutical Pvt. Ltd. Experience certificate
A/16.	Certificate for participation in the Refresher Course on "Progress in pharmaceutical research and technology" from 18.08.2008 to 13.09.2008
A/17.	Certificate for participation in the Refresher Course on "Thrust areas on development of natural products" from 20.11.2008 to 10.12.2008
A/18.	Certificate for participation in the UGC – sponsored Orientation Programme at NEHU from 16.02.2011 to 15.03.2011
A/19.	Certificate for participation in the UGC sponsored Short Term Course workshop entitled "MOOCs, e- content development and open educational resources" from 11.02.2020 to 17.02.2020

I certify that all information including the personal data and duly filled PBAS proforma provided and documentary proof enclosed herewith are correct.



**Signature of the applicant:**

Place: Kolkata

Date: 21.12.2020

Countersigned by:



**Head of the Department/ Director of School /Dean of the Faculty concerned (in case the candidate is Head/Director)**

Signed and stamped electronically

Place: Kolkata

Date: 22 December 2020

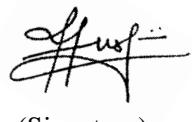
**Office Seal**

19 DR. KUNAL ROY,  
PROFESSOR & HEAD  
DEPT. PHARMACEUTICAL TECHNOLOGY  
JADAVPUR UNIVERSITY  
KOLKATA-700 032, INDIA

**Tag No. 1 for Sl. No.1 Category I of Part B of CAS Application for Assistant Professor Stage 3 to Associate Professor Stage 4**

### **Self-Declaration**

I do hereby declare that I had completed 700 hours average per year during this assessment period under Direct Teaching



(Signature)

**Tag No. 2 for Sl. No.2 Category I of Part B of CAS Application for Assistant Professor Stage 3 to Associate Professor Stage 4**

### **Self-Declaration**

I do hereby declare that I had completed 250 hours average per year during this assessment period under Examination duties (question paper setting, Invigilation, evaluation of answerscripts, etc)



(Signature)

**Tag No. 3 for Sl. No.3 Category I of Part B of CAS Application for Assistant Professor Stage 3 to Associate Professor Stage 4**

**Self-Declaration**

I do hereby declare that I had completed 250 hours average per year during this assessment period under Innovative Teaching – learning methodologies, updating of subject contents/ courses, monitoring, etc. (Up to date knowledge composed from published manuscripts in high impact journals. The acquired knowledge is transferred to the student as per the requirement i.e. within the syllabus. Different scientific, models and schematic animation were employed to make the presentation more interesting)



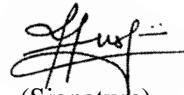
(Signature)

**Tag No. 4 for Sl. No.1 Category II of Part B of CAS Application for Assistant Professor Stage 3 to Associate Professor Stage 4**

## **Self-Declaration**

I do hereby declare that I had completed 250 hours average per year under Student related co-curricular, extension and field based activities (i) Discipline related co-curricular activities (e.g. remedial classes, career counseling, study visit, student seminar and other events.) (ii) Other co-curricular activities (Cultural, Sports, NSS, NCC etc.) Extension and dissemination activities (public /popular lectures/talks/seminars)

- (a) I do hereby declare that I had been the Departmental **Coordinator for Placement and Training of both undergraduate and post graduate students** over the years
- (b) I do hereby declare that I had been the Departmental **in charge of Departmental Instrument Room** over the years
- (c) I do hereby declare that I was the **Organizing Member for Re Union of the Department** over the years
- (d) I do hereby declare that I was the **Presiding Officer for Students Election Faculty of Engineering and Technology** over the years.
- (e) I do hereby declare that I had been the **Teacher in charge for selection and submission of progress report the Jadavpur University Overseas Pharmaceutical Alumni Association (JUOPAA) scholarships** to Undergraduate students over the years
- (f) I do hereby declare that I was **the teacher in charge for EVS examination on 28.03.2018 (Please refer Tag 4/1)**
- (g) I do hereby declare that I was **the teacher in charge for Selection and submission of progress report to Indian Pharmaceutical Association - Ramanbhai Patel Scholarship 2018 (Please refer Tag 4/2)**
- (h) I do hereby declare that I was the **Guest Faculty for M. Pharm Course (Clinical Pharmacy and Pharmacy Practice). (Please refer Tag 4/3)**
- (i) I do hereby declare that I was the **Guest Faculty for Certificate Course in Clinical Research in Hospital (Please refer Tag 4/4)**
- (j) I do hereby declare that I was the **Guest Faculty for Certificate Course in Clinical Research in Hospital (Please refer Tag 4/5)**
- (k) I do hereby declare that I was the **Guest Faculty for Certificate Course in Clinical Research in Phyomedicine and Phytotherapy (Please refer Tag 4/6)**
- (l) I do hereby declare that I was the **Guest Faculty for Certificate Course in Pharmacovigilance in Clinical Research at Clinical Research Centre (Please refer Tag 4/7)**
- (m) I do hereby declare that I was the **Guest Faculty for Certificate Course in Clinical Research in Hospital at Clinical Research Centre (Please refer Tag 4/8)**
- (n) I do hereby declare that I was the **Guest Faculty for Certificate Course in Pharmaceutical Instrumental Analysis (Please refer Tag 4/9)**
- (o) I do hereby declare that I was the **Guest Faculty for Certificate Course in in Pharmacovigilance in Clinical Research (Please refer Tag 4/10)**



(Signature)



Tag 4/1

OFFICE OF THE CONTROLLER OF EXAMINATIONSJADAVPUR UNIVERSITYNOTICE TO THE HODS UNDER FACULTY OF ENGG

Please note that Compulsory EVS Examination 2017-18 will be held on **28<sup>th</sup> March, 2018** from **12 noon to 2 pm in the respective depts.**

**All HOD need to assign room and duty allocation for the said examination through JUMS by 23/3/2018 .Duty allocation letters of PO/Invigilator(s) as assigned by you through JUMS for the said exam on 28/03/2018 will be available at concerned faculty's portal. No further communication will be provided on this.**

The Question papers along with OMR sheets and printed students' attendance sheets will be sent to the respective Office of HOD on 27.3.18 morning. Deputed faculty members are requested to collect the same from that office and submit the duly signed student attendance sheet and OMR sheet to COE's office immediately after the exam within 2-30p.m.

**The Students will appear with First Semester's Examination roll no and admit card.**

A handwritten signature in black ink, appearing to read "Bhattacharyya".

Dated: 21/02/2018

(PROF(DR).SATYAKI BHATTACHARYYA)

Controller of Examinations, JU

A series of handwritten notes in black ink, including "Dr Balabhadra", "Dr Karmaker", "Dr Saha", and "28/02/18".



Pharma/TN/19/142. dt. 30.8.19

# The Indian Pharmaceutical Association (IPA)

(Society Regn No. Bom. 10 of 1960 GBBSD • Public Trust Regn. No. F- 746 (Bom) dt. 4.4.1960)

Kalina, Santacruz (East), Mumbai - 400 098, India • Tel.: +91 22 2667 1072 • Telefax : +91 22 2667 0744  
E-mail : ipacentre@ipapharma.org • Website : http://www.ipapharma.org

Tag 4/2

## MISSION

The Indian Pharmaceutical Association (IPA) founded in 1939, is the national professional body of pharmacists engaged in various facets of the profession of pharmacy. The IPA is committed to promote the highest professional and ethical standards of pharmacy, focus the image of pharmacists as competent healthcare professional, sensitize the community, government and others on vital professional issues and support pharmaceutical education and sciences in all aspects.

IPA/110/266

July 17, 2019

2018 - 2020

**President**

T.V. Narayana

**Head of the Department**

Department of Pharmaceutical Technology

**Immediate**

**Past President**

Rao V.S.V. Vadlamudi

Jadavpur University,

Kolkata - 700032

**Vice Presidents**

**Divisional Heads**

**Community Pharmacy**

Manjiri Gharat

**Sub: Request for progress report of the recipient of IPA - Sri Ramanbhai Patel Scholarship - 2018**

**Education**

S. Vidyadhara

**Hospital Pharmacy**

R.N. Gupta

**Industrial Pharmacy**

J. Jayaseelan

**Regulatory Affairs**

Subhash Mandal

**Hon. Gen. Secretary**

Suresh Khanna

**Hon.Treasurer**

Hemant Mondkar

**Editor - Pharma Times**

Alka Mukne

**Editor - IJPS**

Divakar Goli

**Coordinator**

T.B. Nair

Please refer to our letter No. IPA/110/222 dated 22<sup>nd</sup> February 2019 in connection with IPA -Sri Ramanbhai Patel Scholarship of the following students

1. Neelanjan Chowdhury - Fourth year B.Pharm
2. Sk. Raisuddin Ahamed - Third year B.Pharm
3. Swarnendu Datta - Second year B.Pharm
4. Mr. Abhishek Jaiswal - First year B.Pharm

You are requested to send the progress report with details of marks obtained in the first, second, third and fourth year B. Pharm final examinations for the above students of your college along with your recommendation at the earliest to continue to avail the IPA -Sri Ramanbhai Patel Scholarship of Rs. 25,000/- in support of the first, second & third year B.Pharm for the year respectively. Please note as per the guidelines sent to you earlier, this student will receive Rs. 25,000/- each year till completion of the 4-year B. Pharm course provided he/she maintains good academic record and conduct duly certified by the college.

**We look forward to your positive response at the earliest on or before 1<sup>st</sup> October 2019.**

Thank you very much for your understanding and support.

Best regards,

T.B. Nair  
Coordinator

A committee maybe formed with Dr. K. Kotta & Prof. S.K. Karmakar for completion of the job. To, the HOD, Pharm-Tech. & the new ful. Maiti 28/08/19. T. B. Nair do the work. P. do the work. 21/09/19.

ঢাক্ষেপুর বিশ্ববিদ্যালয়  
কলকাতা-৭০০০৩২, ভারত



\*JADAVPUR UNIVERSITY

KOLKATA-700 032, INDIA

Ref. No. : V-3/215/17

Dated : 20-Feb-17  
২২

Dr. K. Kuotsu

C/o- Dr. Amalesh Samanta

Coordinator, M. Pharm. Course (Clinical  
Pharmacy & Pharmacy Practice)  
Dept. of Pharmaceutical Technology

Jadavpur University  
Kolkata - 700 032

Tag 4/3

Dear Sir,

I am directed to inform you that you are requested to act as Guest Faculty for M. Pharm. Course (Clinical Pharmacy & Pharmacy Practice) in the Department of Pharmaceutical Technology at the Main Campus of this University for the 1<sup>st</sup> Year 2<sup>nd</sup> Semester of the session 2016 - 2017.

You are also informed that you will be required to take classes **at least 10 periods** on Clinical Research -II & you will be paid an honorarium @ **Rs. 500/- per Periods.**

You are, therefore, requested to contact the Coordinator, M. Pharm. Course (Clinical Pharmacy & Pharmacy Practice) for probable dates and time of your classes and kindly send through him / her an acceptance report at an early date.

Yours faithfully,

REGISTRAR

\*Established on and from 24<sup>th</sup> December, 1955 vide Notification No.10986-Edn/IU-42/55 dated 6<sup>th</sup> December, 1955 under Jadavpur University Act, 1955 (West Bengal Act XXIII of 1955) followed by Jadavpur University Act,1981 (West Bengal Act XXIV of 1981)

মূল্যায়: ২৪১৮-৬৬৬৬/৬১৯৮/৬৬৮০/ ৬৮১৫/৬৮৮০

দূরবাত্তি: (৯১)-০৩০-২৪১৮-৬৬১৮/২৪১০-৭১২১

Website : [www.jadavpur.edu](http://www.jadavpur.edu)

E-mail : [registrar@admin.jdvu.ac.in](mailto:registrar@admin.jdvu.ac.in)

Phone : 2414-6666/6194/6643/6495/6443

Fax : (91)-033-2414-6414/2413-7121



E-mail : crctkc@gmail.com  
Phone : 033-2457 2058

## CLINICAL RESEARCH CENTRE (CRC)

Bio Equivalence Centre Building, 3<sup>rd</sup> Floor  
Jadavpur University, Kolkata – 700 032

Ref No. : K.K.KRHI/CRC/JU/2017

Date : 26/07/2017

Dr.K.Kuotsu

Assistant Professor

Tag 4/4

Dept. of Pharm. Tech

Jadavpur University, Kolkata-700032.

Dear Sir,

I am pleased to appoint you as a Guest Faculty for Certificate Course “Clinical Research in Hospital” in the Clinical Research Centre (CRC) at the main campus of this university for the period of 26<sup>th</sup> July 2017 to 26<sup>th</sup> April 2018.

You are therefore, requested to take class as under and you will be paid an honorarium @ Rs.750/-per period, on production of a certificate from the Coordinator.

Subject(s)	Pds./wk	Total pds.in the semester
Pharmacology & drug Development	1	18

You are therefore, requested to contact the Coordinator, Certificate Course “Clinical Research in Hospital” for probable dates and time of your classes and kindly send through him an acceptance report at an early date.

The Coordinator, Certificate course “Clinical Research in Hospital”.





E-mail : crctkc@gmail.com  
Phone : 033-2457 2058

## CLINICAL RESEARCH CENTRE (CRC)

Bio Equivalence Centre Building, 3<sup>rd</sup> Floor  
Jadavpur University, Kolkata – 700 032

Ref No. : K.K./Faculty/CRC/JU/2017

Date : 02.08.17

Dr, K.Kuotsu  
Assistant Professor  
Dept. of Pharm.Tech  
Jadavpur University, Kol-700032

Tag 4/5

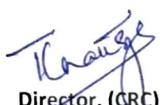
Dear Sir,

I am pleased to appoint you as a Guest Faculty for Certificate Course “Clinical Research in Hospital” in the Clinical Research Centre (CRC) at the main campus of this university for the period of 2<sup>nd</sup> August, 2017 to 1<sup>st</sup> May, 2018

You are therefore, requested to take class as under and you will be paid an honorarium @ Rs.750/-per period, on production of a certificate from the Coordinator.

Subject(s)	Pds./wk	Total pds.in the semester
Pharmacology and Drug Development	1	14

You are therefore, requested to contact the Coordinator, Certificate Course “Clinical Research in Hospital” for probable dates and time of your classes and kindly send through him an acceptance report at an early date.

  
Director, (CRC)

Copy to:

The Coordinator, Certificate course “Clinical Research in Hospital”.





E-mail : crctkc@gmail.com  
Phone : 033-2457 2058

## CLINICAL RESEARCH CENTRE (CRC)

Bio Equivalence Centre Building, 3<sup>rd</sup> Floor  
Jadavpur University, Kolkata – 700 032

Ref No. : K.K./Faculty/CRPP/CRC/JU/2017

Date : 28.10.17.....

Dr. K.Kuotsu  
Assistant Professor  
Dept. of Pharm.Tech  
Jadavpur University, Kol-700032

Tag 4/6

Dear Sir,

I am pleased to appoint you as a Guest Faculty for Certificate Course “**Clinical Research in Phytomedicine & phytotherapy**” in the Clinical Research Centre (CRC) at the main campus of this university for the period of 28<sup>th</sup> October, 2017 to 27<sup>th</sup> July, 2018.

You are therefore, requested to take class as under and you will be paid an honorarium @ Rs.750/-per period, on production of a certificate from the Coordinator.

Subject(s)	Pds./wk	Total pds.in the semester
Introduction to Clinical Research	1	14

You are therefore, requested to contact the Coordinator, Certificate Course “**Clinical Research in Phytomedicine & phytotherapy**” for probable dates and time of your classes and kindly send through him an acceptance report at an early date.

  
Director, (CRC)

Copy to:

The Coordinator, Certificate course “**Clinical Research in Phytomedicine & phytotherapy**”.





E-mail : crctkc@gmail.com  
Phone : 033-2457 2058

## CLINICAL RESEARCH CENTRE (CRC)

Bio Equivalence Centre Building, 3<sup>rd</sup> Floor  
Jadavpur University, Kolkata – 700 032

Ref No. : K.K./Faculty/PVCR/CRC/JU/2017

Date : 19/11/2017...

Dr. K. Kuotsu  
Assistant Professor  
Dept. of Pharm.Tech  
Jadavpur University, Kol-700032

Tag 4/7

Dear Sir,

I am pleased to appoint you as a Guest Faculty for Certificate Course “Pharmacovigilance in Clinical Research” in the Clinical Research Centre (CRC) at the main campus of this university for the period of 19<sup>th</sup> November, 2017 to 18<sup>th</sup> August , 2018

You are therefore, requested to take class as under and you will be paid an honorarium @ Rs.750/-per period, on production of a certificate from the Coordinator.

Subject(s)	Pds./wk	Total pds.in the semester
Clinical Research –I & Clinical Research-II	1	20

You are therefore, requested to contact the Coordinator, Certificate Course “Pharmacovigilance in Clinical Research” for probable dates and time of your classes and kindly send through him an acceptance report at an early date.

  
Director, (CRC)

Copy to:  
The Coordinator, Certificate course “Pharmacovigilance in Clinical Research”.





E-mail : crctkc@gmail.com  
Phone : 033-2457 2058

## CLINICAL RESEARCH CENTRE (CRC)

Bio Equivalence Centre Building, 3<sup>rd</sup> Floor  
Jadavpur University, Kolkata – 700 032

Ref No. : KK/GUEST/CRH/CRC/JU/2018

Date : 12.11.2018

Dr. K.Kuotsu  
Assistant Professor  
Dept. of Pharm.Tech  
Jadavpur University, Kol-700032

Tag 4/8

Dear Sir,

I am pleased to appoint you as a Guest Faculty for Certificate Course “Clinical Research in Hospital” in the Clinical Research Centre (CRC) at the main campus of this university for the period of 17<sup>th</sup> November, 2018 to 30<sup>th</sup> August, 2019.

You are therefore, requested to take class as under and you will be paid an honorarium @ Rs.750/-per period, on production of a certificate from the Coordinator.

Subject(s)	Pds./wk	Total pds.in the semester
Pharmacology and Drug Development	1	10

You are therefore, requested to contact the Coordinator, Certificate Course “Clinical Research in Hospital” for probable dates and time of your classes and kindly send through him an acceptance report at an early date.

Dr. Saumen Karan  
Advisor, (CRC)

Copy to:

The Coordinator, Certificate course “Clinical Research in Hospital”.

Clinical Research Centre (CRC)  
Jadavpur University  
Kolkata - 700032



## CLINICAL RESEARCH CENTRE (CRC)

Bio Equivalence Centre Building, 3<sup>rd</sup> Floor  
Jadavpur University, Kolkata - 700 032

Ref. No. K.KL.PIA/CRC/JU/2018

Date 02.07.2018

Dr. K.Kuotsu  
Assistant Professor  
Dept. of Pharm.Tech  
Jadavpur University, Kol-700032

Tag 4/9

Dear Sir,

I am pleased to appoint you as a Guest Faculty for Certificate Course "Pharmaceutical Instrumental Analysis" in the Clinical Research Centre (CRC) at the main campus of this university for the period of 2<sup>nd</sup> July, 2018 to 30<sup>th</sup> March, 2019.

You are therefore, requested to take class as under and you will be paid an honorarium @ Rs.750/-per period, on production of a certificate from the Coordinator.

Subject(s)	Pds./wk	Total pds.in the semester
Electron Microscopic Techniques	1	16

You are therefore, requested to contact the Coordinator, Certificate Course "Pharmaceutical Instrumental Analysis" for probable dates and time of your classes and kindly send through him an acceptance report at an early date.

Prof. Dr. Tapan Kumar Chatterjee  
Advisor  
Clinical Research Centre (CRC)  
Jadavpur University, Kol-700032

Copy to:

The Coordinator, Certificate course "Pharmaceutical Instrumental Analysis".



# CLINICAL RESEARCH CENTRE (CRC)

Bio Equivalence Centre Building, 3<sup>rd</sup> Floor  
Jadavpur University, Kolkata - 700 032

Ref. No. KK/PVLR/CRC/JU/2019

Date 14/03/19

Dr. K.Kuotsu  
Assistant Professor  
Dept. of Pharm.Tech  
Jadavpur University, Kol-700032

Tag 4/10

Dear Sir,

I am pleased to appoint you as a Guest Faculty for Certificate Course "Pharmacovigilance in Clinical Research" in the Clinical Research Centre (CRC) at the main campus of this university for the period of 14<sup>th</sup> March, 2019 to 13<sup>th</sup> December, 2019.

You are therefore, requested to take class as under and you will be paid an honorarium @ Rs.750/-per period, on production of a certificate from the Coordinator.

Subject(s)	Pds./wk	Total pds.in the semester
Clinical Research -I & Clinical Research-II	1	20

You are therefore, requested to contact the Coordinator, Certificate Course "Pharmacovigilance in Clinical Research" for probable dates and time of your classes and kindly send through him an acceptance report at an early date.

Copy to:

The Coordinator, Certificate course "Pharmacovigilance in Clinical Research".

Saumen Karan  
Co-ordinator (PVCR)

**Tag No. 5 for Sl. No.2 Category II of Part B of CAS Application for Assistant Professor Stage 3 to Associate Professor Stage 4**

## **Self-Declaration**

I do hereby declare that I had completed 300 hours average per year under Contribution to corporate life and management of the department and institution through participation in academic and administrative committees and responsibilities.

- i). Administrative responsibility (including as Dean / Principal / Chairperson / Convener / Teacher-in-charge/similar other duties that require regular office hrs for its discharge)
  - (ii). Participation in Board of Studies, Academic and Administrative Committees
1. I do hereby declare that I was the **Member of the Advisory Committee, UGC CAS, Department of Pharmaceutical Technology, Jadavpur University. (Please refer Tag 5/11)**
  2. I do hereby declare that I was the **Member of the Committee for evaluation of DST Research Fellow, Department of Pharmaceutical Technology, Jadavpur University. (Please refer Tag 5/12)**
  3. I do hereby declare that I was the Member of the **Committee for the seminar on “Evolving trends in pharmaceutical industry & opportunities in pharma industries” held on 20.05.2017. (Please refer Tag 5/13)**
  4. I do hereby declare that I was the **Member of the Administrative Committee of Clinical Research Centre Bioequivalence Building 3<sup>rd</sup> Floor Jadavpur University. (Please refer Tag 5/14)**
  5. I do hereby declare that I was the **Interview Committee Member for selection of various positions at Eminent College of Pharmaceutical Technology Barasat, held on 12.08.2017. (Please refer Tag 5/15)**
  6. I do hereby declare that I was the **Member of the Committee for the National Symposium on “Ashwagandha” held on 09.10.2017. (Please refer Tag 5/16)**
  7. I do hereby declare that I was the **Member of the Administrative Committee of Bioequivalence Study Centre, Jadavpur University. (Please refer Tag 5/17)**
  8. I do hereby declare that I was the **Co-Principal Investigator of DST, West Bengal funded Research Project at Department of Pharmaceutical Technology, Jadavpur University. (Please refer Tag 5/18)**
  9. I do hereby declare that I was the **Examiner for evaluation of Ph. D thesis from Jawaharlal Nehru Technological University. (Please refer Tag 5/19)**
  10. I do hereby declare that I was the **Member of the Academic Research & Research Committee Department of Pharmaceutical Technology, Jadavpur University. (Please refer Tag 5/20)**
  11. I do hereby declare that I am the **Coordinator of Jadavpur University Overseas Pharmaceutical Alumni Association (JUOPAA) over the years. (Please refer Tag 5/20)**
  12. I do hereby declare that I was the **Member of the Admission Committee, Faculty of Engineering and Technology, Jadavpur University. (Please refer Tag 5/21)**
  13. I do hereby declare that I was the **Member of the Volunteers Sub - Committee, for Annual Convocation Day, Jadavpur University held on 24.12.2018. (Please refer Tag 5/22)**
  14. I do hereby declare that I was the **Representative of the Department of Pharmaceutical Technology, Jadavpur University for Degree Scroll Checking held on 21.11.2019. (Please refer Tag 5/23)**

- 15. I do hereby declare that I was the External Examiner – DPST, BIT Mesra, for the M. Pharm. Practical Examination held on 09.04.2019. (Please refer Tag 5/24)**
- 16. I do hereby declare that I was the Member of the Post Graduate Admission Committee Department of Pharmaceutical Technology, Jadavpur University. (Please refer Tag 5/25)**
- 17. I do hereby declare that I was the Member Project/Seminar Committee Department of Pharmaceutical Technology, Jadavpur University. (Please refer Tag 5/25)**
- 18. I do hereby declare that I was the Acting HOD in absence of Prof. P. K. Mukherjee on 08.05.2019. (Please refer Tag 5/26)**
- 19. I do hereby declare that I was the Acting HOD in absence of Prof. P. K. Mukherjee on 21.05.2019. (Please refer Tag 5/27)**
- 20. I do hereby declare that I was the Observer for West Bengal Joint Entrance Examination(WBJEE - 2019) held on 26.05.2019. (Please refer Tag 28)**
- 21. I do hereby declare that I was the Representative of Department of Pharmaceutical Technology, Jadavpur University for UG Pharmacy Admission 2019. (Please refer Tag 5/29)**
- 22. I do hereby declare that I was the Acting HOD in absence of Prof. P. K. Mukherjee on 16.09.2019. (Please refer Tag 5/30)**
- 23. I do hereby declare that I was the Co – Supervisor, for Ph. D. thesis held at Clinical Research Centre Jadavpur University on 19.09.2019. (Please refer Tag 5/31)**
- 24. I do hereby declare that I was the Member of the Volunteers Sub - Committee, for Annual Convocation Day, Jadavpur University held on 24.12.2019. (Please refer Tag 5/32)**



Signature

**UGC, CAS-I Department of Pharmaceutical Technology, Jadavpur University**

**Minutes of the first meeting of the Technical Committee (Constituted in the Advisory Committee Meeting of CAS-I, Department of Pharmaceutical Technology, Jadavpur University) held on 21.03.2017 at 1 pm in the departmental Seminar Room.**

**Members Present:-**

1. Prof. Chiranjib Bhattacharjee, Dean, FET, JU
2. Prof. Sanmoy Karmakar, Member, CAS-I Advisory Committee
3. Dr. Pallab Kanti Haldar, Deputy Co-Ordinator, CAS-I
- Dr. Ketousetuo Kuotsu, Member, CAS-I Advisory Committee
5. Prof. L. K. Ghosh, Co-Ordinator, CAS-I and convenor of the Technical Committee

**The meeting was chaired by Prof. Chiranjib Bhattacharjee, Dean, FET.**

1. It was reported by Prof. L. K. Ghosh that Prof. P.K. Mukherjee over phone has express his inability to join the meeting. However, his suggestions were placed and discussed.
2. Resolved and confirmed that the members of the Technical Committee will enquire about the vendors of LC-MS and Ultracentrifuge as sanctioned under the CAS-I program. Subsequently, pre-tendering meeting to be convened with the Technical Committee members and all such vendors or their authorized representatives. Accordingly, the Technical Committee will fix up and approve the specifications. Thereafter, action to be taken for e-tendering.
3. Resolved further and confirmed that the H.O.D. Pharm. Tech., J.U. be requested to allot a suitable separate space for installation of LC-MS in the department and to do the needful to complete the pre-installation requirements whatever may be required, as per the resolution number 11 of the CAS-I Advisory Committee meeting held on 30-01-2017.
4. Resolved further and confirmed that a one day seminar may be arranged in the next financial year.

The meeting ended with a vote of thanks to the chair.



21/03/2017

(PROF. CHIRANJIB BHATTACHARJEE)



**Prof. Chiranjib Bhattacharjee**  
DEAN  
Faculty of Engineering & Technology  
Jadavpur University,  
Kolkata - 700032



Tag 5/12

Ref.no: S-21/503/17  
Date: 12/05/2017

To,  
Dr. Ketousetuo Kuotsu  
Assistant Professor,  
Department of Pharmaceutical Technology  
Kolkata – 700 032

(Sub- Committee for the evaluation of progress report of DST-Inspire fellow of Mr. Suraj Sharma)

Dear Sir,

**Mr. Suraj Sharma** is carrying on research work as Junior Research Fellow in the DST Inspire Fellowship Scheme under the supervision of Dr. Ketousetuo Kuotsu, Department of Pharmaceutical Technology, of this University since 14.05.2015. He has now applied for extension with promotion to the rank of Senior Research Fellow w.e.f. 14.05.2017 on completion of two years as JRF provided his progress of research work for the said period be evaluated by a three members committee meeting and recommended for the same.

In this connection a meeting will be held on 16<sup>th</sup> May, 2017 (Tuesday) at 1.00 p.m. in the Department of Pharmaceutical Technology, Jadavpur University, Kolkata – 700 032.

May I request you to kindly attend the meeting and evaluate the progress of research work done by Mr. Suraj Sharma.

With Thanks,

Yours faithfully,

*Suraj Sharma*  
REGISTRAR

X

Seminar on  
"EVOLVING TREND IN PHARMACEUTICAL REGULATORY  
&  
OPPORTUNITIES IN PHARMA INDUSTRIES"  
To be held on 20<sup>th</sup> May, 2017  
At  
**DR. K P Basu Memorial Hall, Jadavpur University**

Tag 5/13

Date : 15/05/2017

**Patron:**

Prof. Surjan Das  
Vice-Chancellor, JU

**Chairman:**

Prof.(Dr.) C Bhattacharjee,  
Dean, FET, JU

**Co-Chairmen:**

Prof.(Dr.) T K PAL  
Emeritus Medical Scientist (ICMR)

**Convenor(s):**

Prof. Sanmoy Karmakar  
Dr. Shubhasis Dan

**Members:**

Dr. S Mondal  
Dr. A K Ghosh  
Dr. Avijit Hazra

Dr. Suparna Chatterjee  
Mr. Sankar Gupta  
Dr. Balaram Ghosh

Dr. Arunava Biswas

Dr. Anjan Das

Prof. B Mukherjee

Dr. K. Koutsou

Dr. Pallab Halder

Dr. Nilendra Chatterjee

Mr. Rajesh Bhattacharya

Mrs. Shibani Bose

To

Dr. Ketousetuo Koutsou  
Assistant Professor,  
Pharm. Tech, J.U.

*Subject : Invitation*

Dear Sir/Madam,

We are pleased to inform you that Bioequivalence Study Centre, JU in collaboration with TAAB Health Care Services (unit of TAAB Biostudy Services) and Pharmaguide Services LLP, New Delhi is going to organize a seminar on "EVOLVING TREND IN PHARMACEUTICAL REGULATORY & OPPORTUNITIES IN PHARMA INDUSTRIES" on 20<sup>th</sup> May, 2017 (10-00am) at Dr. K P Basu Memorial Hall, Jadavpur University.

You are cordially invited to participate in the INAUGURAL SESSION at 10.00 a.m.

Your kind consent in this regard will be highly appreciated.

With best regards,

Yours sincerely,

15/5/17  
[Prof. Sanmoy Karmakar]  
Convenor.



T.O  
[Prof. (Dr.) T. K. Pal]  
Co-Chairman.



E-mail : tkchatterjee\_81@rediffmail.com  
crctkc@gmail.com  
Phone : 033-2457 2058

## CLINICAL RESEARCH CENTRE (CRC)

Bio Equivalence Centre Building, 3<sup>rd</sup> Floor  
Jadavpur University, Kolkata - 700 032

Ref. No. Notice/CRC/JU/2017

Date.....06/06/2017.....

Tag 5/14

### NOTICE

A meeting of the Administrative Committee of the **Clinical Research Centre (CRC)** will be held on 16<sup>th</sup> June (Friday), 2017 at the seminar room of the centre at 3:30 pm. Members are requested to make it convenient to attend the meeting.

#### Agenda:

1. To consider for starting of the new certificate course entitled "**Certificate Course on Pharmaceutical Instrumental Analysis**" in collaboration with GNIPST (JIS group) Kolkata.
2. To co-opt a member for our Administrative committee of CRC in place of Late prof Tuhinadri Sen and suggest formation of a set up for carrying out day to day administrative activities.
3. Miscellaneous.

To

Dr. K. Khantsu  
Asstt. of Pharm. Tech  
Jadavpur University  
Kolkata - 700032.

*T.K. Chatterjee*  
Prof. (Dr.) T.K. Chatterjee  
Director  
Clinical Research Centre (CRC)  
JADAVPUR UNIVERSITY, Kolkata - 700 032, India

Ref. No. NF/ECPT/Interview/2017/03

Dated: 19/08/2017

To,

Dr. Ketusetuo Kuotsu,  
Assistant Professor,  
Dept. of Pharmaceutical Technology,  
Jadavpur University,  
Kolkata- 700032



***Sub: Invitation letter to join as an Interview Committee Member***

Sir,

The Department of Pharmacy, Eminent College of Pharmaceutical Technology is currently conducting an Interview (Advertisement published on 12/08/2017 in "The Times of India & Ei Samay") for the following positions-

Sl. No.	Designation	Vacancy
1.	Associate Professor	01
2.	Assistant Professor	05
3.	Lab. Assistant	03

I would like to invite you to serve on the Interview committee and assist with this important recruitment. It is my hope that you will be able to accept and serve in this capacity.

The interview will be held on 22<sup>nd</sup> August' 2017 from 11am onwards at Eminent Group of Colleges, Moshpukur, Barbaria, Barasat, Kolkata- 700126.

Thank you for your consideration of assisting with the selection process for this important position.

Thanks and regards.

Yours Sincerely,



Principal

Eminent College of Pharmaceutical Technology  
Barbaria, Barasat, Kolkata - 700 126

4<sup>th</sup> Convention: SFE – INDIA, 2017

*National Symposium*

*"Ashwagandha"*

September 09-10, 2017

*Organized by:*

School of Natural Product Studies

Jadavpur University, Kolkata, India

web: [www.jaduniv.edu.in](http://www.jaduniv.edu.in)



*In Association with:*

Society for Ethnopharmacology (SFE - INDIA)

23/3 Saktigarh, Kolkata

[www.ethnopharmacology.in](http://www.ethnopharmacology.in)

Venue: Jadavpur University, Kolkata

Ref: PKM/SNPS/JU/Conf -17 /112

August 29, 2017

To

Dr. Ketousetuo Kuotsu

Dept. of Pharm. Tech.

Jadavpur University

Kolkata 700032, WB, India

Subject: Invitation to join the 4<sup>th</sup> Convention of the Society for Ethnopharmacology; National Symposium on "Ashwagandha" and Ethnopharmacology Conclave on "Uses of Medicinal Plants by Traditional Healers of India - Local Health Tradition" during September 09-10, 2017 at Jadavpur University, Kolkata.

Dear Sir

I would like to invite you to join the 4<sup>th</sup> Convention of the Society for Ethnopharmacology, India: National Symposium on "Ashwagandha" and Ethnopharmacology conclave on "Uses of Medicinal Plants by Traditional Healers of India - Local health tradition" during September 09-10, 2017 at Jadavpur University, Kolkata. This symposium will focus on several contemporary issues on the drug discovery & development from medicinal plants together with their quality evaluation, validation and safety related aspects.

I would request you to please join the inaugural program on 9<sup>th</sup> September 2017 at 10 AM at Gandhi Bhavan followed by lunch at University Guest House and other programs as scheduled.

Dr. Manju Sharma, (Padma Bhushan Awardee) Former Secretary to the Govt. of India, Department of Biotechnology and Distinguished Women Scientist Chair, NASI, Allahabad has agreed to deliver the Keynote address.

I am sure your esteemed presence will enrich this event to a high extent.

With my best personal regards

*Pulok K Mukherjee*

Prof. Pulok K Mukherjee, PhD, FRSC

Organizing Secretary

4<sup>th</sup> Convention: SFE-India - 2017



Secretariat

National Symposium

School of Natural Product Studies

Jadavpur University, Kolkata 700 032

E-mail: [isesnpju@gmail.com](mailto:isesnpju@gmail.com), Web: [www.jaduniv.edu.in](http://www.jaduniv.edu.in)

Tele-Fax: +91 33 2414 6046



# BIOEQUIVALENCE STUDY CENTRE

Department of Pharmaceutical Technology, Jadavpur University, Kolkata - 700 032

Tel : (033) 24146967 Fax : (033) 24146186, Email : tkpal\_12@yahoo.com, tkpal12@gmail.com

Website : www.biostudy.in

To

Dr. K Kuotsu

Asst. Professor

Dept. of Pharm. Tech.

Jadavpur University

Kolkata – 700032.

Tag 5/17

## Subject: Invitation for the Administrative Committee meeting of Bioequivalence Study Centre

Dear Sir/Madam,

This is to inform you that the next Administrative Committee meeting of our centre will be held on **18/09/2017 (1:30PM)** at the Seminar Hall of Bioequivalence Study Centre.

Your kind participation in the above meeting will be highly appreciated.

With best regards,

Yours sincerely

  
11/09/2017

(Prof. Sanmoy Karmakar)

In-Charge



### Agenda(s):

1. Approval of Bioequivalence Study Centre as CDSCO [DCG (I)] approved Bio-analytical facility.
2. Consideration of Academic, Research and Course activities under Faculty of Interdisciplinary Studies, Law and Management (ISL & M).
3. Miscellaneous



Approved by DCGI vide Letter No. 4-14/97-DC Pt (I) dt. 21<sup>st</sup> OCT 2002



**Dr. Tapan Kumar Chatterjee**  
M. Pharm. (Cal), Ph. D. (Cal), FIC (Cal)  
ARSC (Lond), MACS (USA)

E-mail : tkchatterjee\_81@rediffmail.com  
Phone : (033) 2414-6666 (Extn. 2058)

**Associate Professor,**  
Division of Pharmacology,  
Department of Pharmaceutical Technology,  
Jadavpur University, Kolkata-700 032, India

Ref. No. : KK/Project/Cr.-P1/TKC/Jv/2017

Dated 03/11/2017.....

To  
Dr. K. Kuotsu,  
Asst. Professor,  
Dept of Pharm. Tech.,  
Jadavpur University,  
Kolkata-700032.

Tag 5/18

Dear Dr. Kuotsu ,

I would like to inform you that I am running one DST, WB funded research project entitled "Detailed studies of the new phytochemical PITC-2 isolated from tissue cultured Medicinal plant *Pluchea indica* (L.) Less with special emphasis on anti-cancer, anti-tumor angiogenesis and anti-leishmanial activities" (Sanctioned Project Memo No. 775(Sanc.)/ST/P/S & T/1G-27/2014 dated 22/12/2015) as PI. Mrs.Sharmily Chakraborty , junior research fellow is working in that project and pursuing her PhD thesis work under my guidance.

As, I will retire from my University service on 31.12.2017, I need one Co- PI to join to the project to continue the said project and the fellow can complete her PhD degree. This is as per the rule of our University.

So, I request you to give your kind consent for working as a Co-PI for the said project.

I am eagerly waiting for your consent in this regard.

Thanking You,

Yours faithfully,

Prof (Dr) T.K Chatterjee

Agreed  
  
Spd  
3/11/17

Prof. (Dr.) T.K. Chatterjee  
Professor  
Division of Pharmacology  
Department of Pharmaceutical Technology  
Jadavpur University, Kolkata-700 032, India



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
 ANANTAPUR  
 ANANTHAPURAMU - 515 002 (A.P)**

**Prof. K.Rama Naidu**  
 M.Tech., Ph.D., (I.I.T., KGP), MIEEE,  
 DIRECTOR OF EVALUATION

**CONFIDENTIAL**

**.Lr.No.488/ Ph.D/PS-58a/KRT/PS/2017, Dt 14<sup>th</sup> November, 2017.**

Dear Sir,

Sub:- JNTUA-Examination Branch -Evaluation of Ph.D. Thesis –  
**Mr. KARUNAKARA REDDY T**, in the faculty of **Pharmaceutical Sciences** –  
 Reg.

Ref:- Your email letter dated **13.11.2016**.

ooOoo

I thank you for your acceptance to be an examiner for evaluating the Ph.D thesis of this University. I am enclosing the thesis entitled "**FORMULATION AND EVALUATION OF CERTAIN SELF- EMULSIFYING DRUG DELIVERY SYSTEMS (SEDDSS)**" submitted by **Mr. KARUNAKARA REDDY T**, in the faculty of **Pharmaceutical Sciences**, of this University. I request you to evaluate the same and make one of the following four definite recommendations, in the enclosed format.

1. THE THESIS ATTAINS THE REQUIRED STANDARD FOR THE AWARD OF PH.D.
2. THE THESIS REQUIRED REVISION AND SUBMISSION TO DOCTORAL COMMITTEE
3. THE THESIS REQUIRES REVISION AND RE-SUBMISSION FOR RE-EVALUATION BY THE SAME EXAMINER
4. THE THESIS IS REJECTED

Along with this, you are also requested to give a detailed report along with the questions (on a separate sheet) to be asked if any in the Viva – Voce Examination. Your report is expected to cover the strengths and weaknesses (if any) of the thesis and also the contribution made by the candidate in the concerned research area. Please send them to me by name under Registered Post/Speed post.

Kindly acknowledge receipt of the letter and the thesis.

With kind regards,

Yours faithfully,

**Director of Evaluation**

To  
**Dr.Ketousetokuotsu**  
**Professor,**  
**Dept of Pharmaceutical Technology,**  
**Jadavpur University,**  
**Kolkata - 700032**



DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY  
FACULTY OF ENGINEERING & TECHNOLOGY

Tag 5/20

- b) UG/PG- Academic, Research & Report Committee- Dr. P. K. Haldar (Convener). Prof. Amalesh Samanta, Prof. T.K. Maity, Dr. K. Koutsu, Prof. L.K. Ghosh.
- c) Dept. Developmental & Infrastructure Committee- Prof. S. Karmakar (Convener), Prof. L.K. Ghosh, Prof. (Mrs) J. Khanam , Prof. S. C. Mandal.
- d) Dept. Research Committee – (As existing) Prof. T. Jha , Dr. P. K. Haldar, Prof. S. C. Mandal, and Prof. T. Mukherjee (IICB as external).
- e) Dept. Purchase Committee- (As existing) Prof. T.K. Maity, Prof. Amalesh Samanta, Prof. S. Karmakar, Dr. S. Dewanjee, Dr. P. K. Haldar and the Store Keeper of the Dept. of Pharm. Tech.
- f) Training & Placement Committee- Dr. S. Dewanjee (Convener), Prof. T.K. Maity, Dr. K. Koutsu.
- g) Anti ragging Committee- (As existing) Prof. S. Karmakar, Prof. A. Samanta, Dr. S. Dewanjee, Prof. (Mrs) J.Khanam.
- h) Jadavpur University Overseas Pharmaceutical Alumni Association (JUOPAA) Committee- Prof. L. K. Ghosh, Dr. K. Koutsu.

- 11) The convener will call for meeting as per request from the H.O.D. If any member of a committee fails to attend for the meeting consecutively the respective member may be requested for a fresh replacement in his or her place or HOD will nominate another faculty accordingly.
- 12) To take care of the student's poor attendance in regular class, the members of the UG/PG-Academic, Research & Report committee should meet with the respective class representatives at regular interval.
- 13) Prof. Pulok K. Mukherjee and Prof. T. K. Maity will conduct Chemistry III Lab.
- 14) Any request for application for adjunct faculty by any visiting faculty members - should never be forwarded to the J.U. Authority through the Dept.
- 15) As per the request of the Dept. Librarian, the library annex will have to be refurbished for better book keeping facility.
- 16) A proposal for a seminar on "Clinical Research: Present scenario in Pharmacovigilance and Clinical Trials" on 17/02/18 was approved, as proposed by Prof Amalesh Samanta, Co-ordinator, MPharm in Clinical Pharmacy and Pharmacy Practice.
- 17) BOS noted that the HPLC which Prof A. Samanta received from Prof TK Chatterjee is out of order and is kept in the room of Clinical Pharmacy and Pharmacy Practice



যা দৃশ্য পুনর্বিশ্লেষণ  
কলকাতা - 700032, ভারত



JADAVPUR UNIVERSITY  
KOLKATA-700 032, INDIA

DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY  
FACULTY OF ENGINEERING & TECHNOLOGY

- b) UG/PG- Academic, Research & Report Committee-** Dr. P. K. Haldar (Convener), Prof. Amalesh Samanta, Prof. T.K. Maity, Dr. K. Koutsu, Prof. L.K. Ghosh.
- c) Dept. Developmental & Infrastructure Committee-** Prof. S. Karmakar (Convener), Prof. L.K. Ghosh, Prof. (Mrs) J. Khanam, Prof. S. C. Mandal.
- d) Dept. Research Committee –** (As existing) Prof. T. Jha, Dr. P. K. Haldar, Prof. S. C. Mandal, and Prof. T. Mukherjee (IICB as external).
- e) Dept. Purchase Committee-** (As existing) Prof. T.K. Maity, Prof. Amalesh Samanta, Prof. S. Karmakar, Dr. S. Dewanjee, Dr. P. K. Haldar and the Store Keeper of the Dept. of Pharm. Tech.
- f) Training & Placement Committee-** Dr. S. Dewanjee (Convener), Prof. T.K. Maity, Dr. K. Koutsu.
- g) Anti ragging Committee-** (As existing) Prof. S. Karmakar, Prof. A. Samanta, Dr. S. Dewanjee, Prof. (Mrs) J. Khanam.
- h) Jadavpur University Overseas Pharmaceutical Alumni Association (JUOPAA) Committee-** Prof. L. K. Ghosh, Dr. K. Koutsu.

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- 17) BOS noted that the HPLC which Prof A. Samanta received from Prof TK Chatterjee is out of order and is kept in the room of Clinical Pharmacy and Pharmacy Practice



Tag 5/21

JADAVPUR UNIVERSITY  
FACULTY OF ENGG. & TECH.

Date: September 13, 2018

As directed by the Dean, F.E.T., an emergency meeting of the Admission Committee (F.E.T.) will be held on 14.09.2018 at 3-00 p.m. in the Committee Room No. 2 of the University.

Members and invitees are requested to attend the meeting

(Dr. B. Karmakar)  
Principal Secretary, FET.

**Agenda:**

To discuss on the following Information Brochure for Spot Admission of JELET-2018 according to revised eligibility criteria along with allotted rank by WBJEE Board – 2018.

By Quots  
Please join the above meeting in our room  
and send us  
Please refer 13/9/18

Dept. of Head  
Pharmaceutical Technology  
Jadavpur University  
Kolkata - 700 032, W.B. India

যাদবপুর বিশ্ববিদ্যালয়  
কলকাতা - 700032, ভারত



JADAVPUR UNIVERSITY  
KOLKATA-700 032, INDIA

DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY  
FACULTY OF ENGINEERING & TECHNOLOGY

Ref. No.: HOD/PKM -18/234

Date: 18/12/2018

Tag 5/22

To

Dr. Aparup Konar,  
Director of Physical Instruction,  
Office of the DPI, Sports Board, Amenity Centre Building (Ground Floor), JU Main Campus.  
Email: [kaparup@gmail.com](mailto:kaparup@gmail.com)  
Phone No.:9734707088

Dear Sir,

In response to the letter Ref. No. REC/N/407/18 dated 14<sup>th</sup> December, 2018 from the Registrar, J.U., I would like to inform you that the following teachers will act as members of the Volunteers Sub-Committee and for maintaining & managing the students / degree recipients of dept. of Pharm. Tech., on the convocation day.

Sl. No.	Name of the Teacher Volunteers	Mobile No.
1.	Dr. K. Kuotsu	8981099151
2.	Dr. S. Dewanjee	9830628765

This is for your kind information please.

Thank you,  
With regards,

  
Prof. Pulok K. Mukherjee  
Head, Dept. of Pharm. Tech.  
Jadavpur University

Head  
Dept. of Pharmaceutical Technology  
Jadavpur University  
Kolkata-700 032, W.B. India

Cc to:

- Registrar, Jadavpur University, Kolkata-700032.
- Dr. K. Kuotsu, Assistant Professor, Dept. of Pharm. Tech., J.U., Kolkata-700032.
- Dr. S. Dewanjee, Assistant Professor, Dept. of Pharm. Tech., J.U., Kolkata-700032.



OFFICE OF THE CONTROLLER OF EXAMINATIONS  
JADAVPUR UNIVERSITY  
KOLKATA - 700 032, INDIA  
Website : www.jaduniv.edu.in

Tag 5/23

VERY URGENT

Dated : 21-Nov-2019

To,

The Head, Pharmacy,  
Department / School of

Sub. : Degree Scroll Checking.

Dear Sir / Madam,

You are requested to send your representative(s) for checking of all degree scrolls under your Department / School before 12-December-2019 between 11.00 A.M. and 01.00 P.M. at the office of the undersigned (Room No. 03, Contact Persons : Shri Gopal Chakraborty, Smt. Manika Saha, Smt. Mrinalini Das). All the checking must be completed by the said time.

Your kind cooperation in this regard will be highly appreciated.

Thanking you,

Yours sincerely,

Bhattacharyya  
(DR. SATYAKI BHATTACHARYYA)

Controller of Examinations

Dr Satyaki Bhattacharyya  
Please see  
20/11/19

Tag 5/24

From: HOD Pharmaceutical Sciences & Technology <[hod.pharm@bitmesra.ac.in](mailto:hod.pharm@bitmesra.ac.in)>  
Date: Tue, Apr 2, 2019, 18:03  
Subject: Appointed as External Examiner - DPST, BIT Mesra  
To: <[ketousetuo@yahoo.co.in](mailto:ketousetuo@yahoo.co.in)>  
Cc: Dr. (Mrs.) Trishna Bal <[trishna.bal@bitmesra.ac.in](mailto:trishna.bal@bitmesra.ac.in)>, Dr. (Mrs.) Trishna Bal <[trishna.bal@gmail.com](mailto:trishna.bal@gmail.com)>

Dear Dr. Kuotsu,

I am hereby directed to convey that you are being appointed as External Examiner for conducting the Practical End semester examination of II. M. Pharmacy students for the subject MPH205P Pharmaceutics Practical II on 09th or 10th April, 2019 as per your convenience.

Remuneration and TA/DA will be paid as per Institute norms.

**Dr. S. Samanta**  
Professor & Head  
Department of Pharmaceutical Sciences & Technology  
Birla Institute of Technology  
Mesra, Ranchi - 835 215 (Jharkhand)  
Tel: 0651-2276247  
FAX: 0651-2275290

জ্ঞান পুর বিশ্ববিদ্যালয়  
কলকাতা - 700032, ভারত



JADAVPUR UNIVERSITY  
KOLKATA-700 032, INDIA

**DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY  
FACULTY OF ENGINEERING & TECHNOLOGY**

Ref. No.- HOD/PKM/-19/80

Date:22/04/2019

Minutes of the BOS meeting held on 17<sup>th</sup> April, 2019 in the Library of the Dept. of Pharm. Tech. J.U. at 3 pm.

Following members were present:

- |                          |                      |                        |
|--------------------------|----------------------|------------------------|
| 1) Prof. P. K. Mukherjee | 2) Prof. Tanmoy Bera | 3) Dr. Saikat Dewanjee |
| 4) Dr. K. Kuotsu         | 5) Prof. Tarun Jha   | 6) Prof. T. K. Maity   |
| 7) Prof. K. Roy          | 8) Prof. S. Karmakar |                        |

**Minutes:**

- 1) The minutes of the last BOS meetings held on 27-02-2019 were confirmed.
- 2) It was resolved that the admission of Master in Pharmacy students for Non-GPAT category and Clinical Pharmacy and Pharmacy Practice for the year 2019 will be made as per the PG admission rules of the Faculty of Engineering & Technology, J.U.

PG Admission committee of the Department for the year 2019-2020 was constituted as follows:-

Dr. S. Karamar, Dr. K. Roy, Dr. K. Kuotsu, Dr. S. Dewanjee, Dr. P. K. Haladar, Dr. T. Jha, Dr. T. K. Maity, Dr. P. K. Mukherjee (Head).

It was resolved that Dr. S. Karmakar will be the Coordinator of the above committee.

- 3) It was resolved that B. Pharm. 4<sup>th</sup> year Project/Seminar will be held on 27<sup>th</sup>, 28<sup>th</sup>, 29<sup>th</sup> May, 2019 from 11:30 AM onwards at Library of the Department. The M. Pharm. 1<sup>st</sup> year presentation for the Term paper leading to thesis will be on 6<sup>th</sup> and 7<sup>th</sup> June, 2019 from 11:30 AM onwards at Library of the Department.

A committee was made for this purpose as follows:

Dr. P. K. Haldar, Dr. T. K. Maity, Dr. S. Karmakar, Dr. K. Kuotsu, Dr. T. Bera, Dr. K. Roy, Dr. T. Jha, Dr. S. Dewanjee, Dr. P. K. Mukherjee (Head) along with the supervisor of the respective U.G. and P.G. students.

It was resolved that Dr. P. K. Haldar will be the Coordinator of the above committee.

- 4) Discussion was made on the proposed DST-SAIF facilities at Jadavpur University. BOS welcome the proposed facility if approved by DST and agreed to pay necessary charges for the instruments for their research work through the DST-SAIF.

- 5) The HOD highlighted again about the present situation and initiatives taken for placement and training of U.G. and P.G. students. It was resolved that the placement committee will conduct meeting/discussion with the OSD and the students for necessary training and placement on urgent basis.



ঝান্দ পুর বিশ্ববিদ্যালয়  
কলকাতা - 700032, ভারত



JADAVPUR UNIVERSITY  
KOLKATA-700 032, INDIA

**DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY**  
**FACULTY OF ENGINEERING & TECHNOLOGY**

Ref. No.- HOD/PKM/-19/80

Date:22/04/2019

Minutes of the BOS meeting held on 17<sup>th</sup> April, 2019 in the Library of the Dept. of Pharm. Tech. J.U. at 3 pm.

Following members were present:

- |                          |                      |                        |
|--------------------------|----------------------|------------------------|
| 1) Prof. P. K. Mukherjee | 2) Prof. Tanmoy Bera | 3) Dr. Saikat Dewanjee |
| 4) Dr. K. Kuotsu         | 5) Prof. Tarun Jha   | 6) Prof. T. K. Maity   |
| 7) Prof. K. Roy          | 8) Prof. S. Karmakar |                        |

**Minutes:**

- 1) The minutes of the last BOS meetings held on 27-02-2019 were confirmed.
- 2) It was resolved that the admission of Master in Pharmacy students for Non-GPAT category and Clinical Pharmacy and Pharmacy Practice for the year 2019 will be made as per the PG admission rules of the Faculty of Engineering & Technology, J.U.

PG Admission committee of the Department for the year 2019-2020 was constituted as follows:-

Dr. S. Karaman, Dr. K. Roy, Dr. K. Kuotsu, Dr. S. Dewanjee, Dr. P. K. Haladar, Dr. T. Jha, Dr. T. K. Maity, Dr. P. K. Mukherjee (Head).

It was resolved that Dr. S. Karmakar will be the Coordinator of the above committee.

- 3) It was resolved that B. Pharm. 4<sup>th</sup> year Project/Seminar will be held on 27<sup>th</sup>, 28<sup>th</sup>, 29<sup>th</sup> May, 2019 from 11:30 AM onwards at Library of the Department. The M. Pharm. 1<sup>st</sup> year presentation for the Term paper leading to thesis will be on 6<sup>th</sup> and 7<sup>th</sup> June, 2019 from 11:30 AM onwards at Library of the Department.

A committee was made for this purpose as follows:

Dr. P. K. Haladar, Dr. T. K. Maity, Dr. S. Karmakar, Dr. K. Kuotsu, Dr. T. Bera, Dr. K. Roy, Dr. T. Jha, Dr. S. Dewanjee, Dr. P. K. Mukherjee (Head) along with the supervisor of the respective U.G. and P.G. students.

It was resolved that Dr. P. K. Haladar will be the Coordinator of the above committee.

- 4) Discussion was made on the proposed DST-SAIF facilities at Jadavpur University. BOS welcome the proposed facility if approved by DST and agreed to pay necessary charges for the instruments for their research work through the DST-SAIF.

- 5) The HOD highlighted again about the present situation and initiatives taken for placement and training of U.G. and P.G. students. It was resolved that the placement committee will conduct meeting/discussion with the OSD and the students for necessary training and placement on urgent basis.



জ্যাদবপুর বিশ্ববিদ্যালয়  
কলকাতা-৭০০০৩৬, ভারত



\*JADAVPUR UNIVERSITY  
KOLKATA-700 032, INDIA

Ref. No. : P-11804/19  
Dated : 23-May-19  
২৩

Dr. K. Koutsu  
Assistant Professor  
Department of **Pharmaceutical Technology**  
Jadavpur University  
Kolkata – 700 032.

Tag 5/26

Dear Sir,

It is noted that you had acted as Head of the Department of **Pharmaceutical Technology** in the absence of **Prof. Pulok K. Mukherjee, H.O.D, Pharmaceutical Technology** on **08.05.2019.**

Yours faithfully,

*S Baru*  
23.5.19

REGISTRAR

\* Established on and from 24<sup>th</sup> December, 1955 vide Notification No.10986-Edn/IU-42/55 dated 6<sup>th</sup> December, 1955 under Jadavpur University Act, 1955 (West Bengal Act XXXIII of 1955) followed by Jadavpur University Act,1981 (West Bengal Act XXIV of 1981)

যাদবপুর বিশ্ববিদ্যালয়  
কলকাতা-৭০০০৩২, ভারত



\*JADAVPUR UNIVERSITY  
KOLKATA-700 032, INDIA

Ref. No. : P-1 / 808 / 19  
Dated : 23-May-19  
26

Dr. K. Koutsu  
Assistant Professor  
Department of **Pharmaceutical Technology**  
Jadavpur University  
Kolkata – 700 032.

Tag 5/27

Dear Sir,

It is noted that you had acted as Head of the Department of **Pharmaceutical Technology** in the absence of **Prof. Pulok K. Mukherjee, H.O.D, Pharmaceutical Technology** on **21.05.2019.**

Yours faithfully,

*NBam 24-05-19*  
REGISTRAR

\* Established on and from 24<sup>th</sup> December, 1955 vide Notification No.10986-Edn/IU-42/55 dated 6<sup>th</sup> December, 1955 under Jadavpur University Act, 1955 (West Bengal Act XXXIII of 1955) followed by Jadavpur University Act,1981 (West Bengal Act XXIV of 1981)



# West Bengal Joint Entrance Examinations Board

AQ-13/1, Sector-V, Salt Lake City, Kolkata - 700 091

Phone No. : 2367-1142/48/59/98/99, Tele Fax : 2367-1149/1148

**CONFIDENTIAL**

No. : WBE/EX-21

Dated : 16.05.2019

To

**Dr. Ketousetuo Kuotsu**

Assistant Professor, Department Of Pharmaceutical Technology, Ju  
Jadavpur University

Tag 5/28

**Subject :** Appointment as **BOARD OBSERVER** for the **West Bengal Joint Entrance Examination (WBJEE-2019)** for admission to Engineering/Technological/Architecture Degree Courses in Universities/Colleges in West Bengal to be held on **26.05.2019 (Sunday)**.

Sir/Madam,

It is my pleasure to inform you that the Board has appointed you as an **OBSERVER** for the Joint Entrance Examination,2019 (**WBJEE-2019**) to be held on **26.05.2019(Sunday)** in the under mentioned examination centre :

**Name of the Examination Centre : Techno International Batanagar**

**Address of the Centre : B7-360/New, Putkhali, Ward No. 30, Maheshtala,**

**Centre Code No : 89103**

**Name of the Centre-in-Charge with Contact No: Mr. Indranil Sengupta, 9830038895**

You are requested to present at the Examination Centre by **9.00 a.m.** positively and also conduct a Meating with the Centre-in-Charge(s) and the invigilators at **9.15 a.m.** for smooth conduct of the examination. The Board is looking forward to receive your sincere cooperation in this regard. You are requested to read carefully the duties and responsibilities as cited in the **Guidelines for Board Observer** and abide by the same.

A consolited honorium of Rs. 3500 (Rupees-Three thousand five hundred only) for this work and the conveyance charges would be reimbursed as per enclosed guidelines.

The following downloadable documents are enclosed for your perusal and necessary action accordingly:

1. Guidelines to Board Observers.
2. Pre-receipt remuneration and TA/DA Bill.
3. Proforma of Confidential report.

If you are not willing to act as Board Observer, please be informed through [wbjeeb.examinations@gmail.com](mailto:wbjeeb.examinations@gmail.com) immediately after receiving the offer letter.

***You are also requested to take requisite permission from the appropriate authority, if necessary, for the assigned duty.***

Thanking you,

Yours faithfully,

**(Prof.D.K.Mitra)  
Vice-Chairman**

West Bengal Joint Entrance Examinations Board

যাদবপুর বিশ্ববিদ্যালয়  
কলকাতা - 700032, ভারত



JADAVPUR UNIVERSITY  
KOLKATA-700 032, INDIA

DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY  
FACULTY OF ENGINEERING & TECHNOLOGY

Ref. No. : HOD/PKM-19/138

Date:- 17/07/2019

To

Dr. P.K. Haldar,  
Dr. S. Dewanjee  
Dr. K. Kuotsu

Tag 5/29

Department of Pharmaceutical Technology,  
Jadavpur University,  
Kolkata-700032.

Dear Sir,

I would like to request you to be present for the UG Pharmacy admission for verification of documents of the allotted candidates as per the attached list.

Please do the needful in this regard.

Thank You,  
With regards,

Prof. Pulok K. Mukherjee, 18/12/19  
Head, Department of Pharm. Tech.,  
Jadavpur University.



Enclosure: As above.

যাদবপুর বিশ্ববিদ্যালয়  
কলকাতা-৭০০০৩২, ভারত



\*JADAVPUR UNIVERSITY  
KOLKATA-700 032, INDIA

Ref. No. : P-1/1482/19  
Dated : 23-Sep-19  
25

Dr. Ketusetuo Kuotsu  
Assistant Professor  
Department of **Pharmaceutical Technology**  
Jadavpur University  
Kolkata – 700 032.

Tag 5/30

Dear Sir,

It is noted that you had acted as Head of the Department of **Pharmaceutical Technology** in the absence of **Prof. Pulok K. Mukherjee, H.O.D, Pharmaceutical Technology** on **16.09.2019.**

Yours faithfully

REGISTRAR

\* Established on and from 24<sup>th</sup> December, 1955 vide Notification No.10986-Edn/IU-42/55 dated 6<sup>th</sup> December, 1955 under Jadavpur University Act, 1955 (West Bengal Act XXIII of 1955) followed by Jadavpur University Act, 1981 (West Bengal Act XXIV of 1981)

মূল্যায়: ২৪১৪-৬৬৬৮/৬১৯৮/৬৬৮০/ ৬৪৯৫/৬৪৮৩  
দূরবর্তী: (৯১)-০৩৩-২৪১৪-৬৪১৪/২৪১৩-৯১২১

Website: [www.jaduniv.edu.in](http://www.jaduniv.edu.in)  
E-mail:[registrar@admin.jdvu.ac.in](mailto:registrar@admin.jdvu.ac.in)

Phone : 2414-6666/194/6643/6495/6496  
Fax : (91)-033-2414-6414/2413-7121

যাদবপুর বিশ্ববিদ্যালয়  
কলকাতা-৭০০০৩২, ভারত



\*JADAVPUR UNIVERSITY  
KOLKATA-700 032, INDIA

FACULTY OF INTERDISCIPLINARY STUDIES, LAW & MANAGEMENT

Date: 12th September, 2019

To

Dr. Ketousetuo kuotsu  
Director, Clinical Research Centre (CRC)  
Jadavpur University,  
Kolkata - 700032

Tag 5/31

Sir,

This is to inform you that Pre-submission seminar of Ms. Farhana Rizwan about her thesis entitled "Renoprotective, antioxidant and anti-inflammatory effects of Stevia in CKD patients: a comparison with ACE inhibitor, enalapril and Ca-channel antagonist, Verapamil", PhD Scholar (Reg. No. – D-7/ISLM/66/16) of Dept. of Pharmaceutical Technology, J.U. will be held on 19<sup>th</sup> September, 2019 at 1:00 p.m. at meeting room of Faculty of Interdisciplinary Studies Law & Management, Jadavpur University.

In this connection you are requested to attend the said Pre-Submission Seminar of Ms. Farhana Rizwan on 19<sup>th</sup> September, 2019 at 1:00 p.m. please, as a supervisor.

Thanking You,

  
(Siddhartha Bhattacharya)

Secretary,  
Faculty Council of Interdisciplinary Studies Law & Management, J.U.

\*Established on and from 24<sup>th</sup> December, 1955 vide Notification No.10986-Edn/IU-42/55 dated 6<sup>th</sup> December, 1955 under Jadavpur University Act, 1955 (West Bengal Act XXIII of 1955) followed by Jadavpur University Act,1981 (West Bengal Act XXIV of 1981)



DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY  
FACULTY OF ENGINEERING & TECHNOLOGY

Ref. No.: HOD/PKM -19/197

Date: 11/12/2019

To  
Dr. Aparup Konar,  
Director of Physical Instruction,  
Office of the DPI, Sports Board, Amenity Centre Building (Ground Floor), JU Main Campus.  
Email: dir.phy.ins@jadavpuruniversity.in  
Phone No.:9734707088

Tag 5/32

Dear Sir,

In response to the letter, vide Ref. No. REC/N/471/19 dated 9<sup>th</sup> December, 2019 from the Registrar, J.U., I would like to inform you that the following teachers will act as members of the Volunteers Sub-Committee and for maintaining & managing the students / degree recipients of dept. of Pharm. Tech., on the convocation day.

Sl. No.	Name of the Teacher Volunteers	Mobile No.
1.	Dr. K. Kuotsu	8981099151
2	Dr. S. Dewanjee	9830628765

This is for your kind information please.

Thank you,  
With regards,

Prof. Pulok K. Mukherjee  
Head, Dept. of Pharm. Tech.

Jadavpur University

Head  
Dept. of Pharmaceutical Technology  
Jadavpur University  
Kolkata-700032, W.B. India

Cc to:

- Registrar, Jadavpur University, Kolkata-700032.
- Dr. K. Kuotsu, Assistant Professor, Dept. of Pharm. Tech., J.U., Kolkata-700032.
- Dr. S. Dewanjee, Associate Professor, Dept. of Pharm. Tech., J.U., Kolkata-700032.

**Tag No. 6 for Sl. No.3 Category II of Part B of CAS Application for Assistant Professor Stage 3 to Associate Professor Stage 4**

**Self-Declaration**

I do hereby declare that I had completed 250 hours average per year under Professional Development activities (Professional Development activities (such as participation in seminars, conferences, short term training courses, industrial experience, talks, lectures in refreshers/faculty development courses, dissemination and general articles and any other contribution)

- ✓ 1. This is to declare that I participated in the Workshop on MOOCs, e content development and open Educational Resources from 11.02.2020 to 17.02.2020, organized by the School of Media, Communication and Culture and C- MATER, Department of Computer Science & Engineering, Jadavpur University. (Please refer Tag 6/33)
- ✓ 2. This is to declare that I participated in the UK – India Newton Babha Fund Research Links Workshop on “Scopes and challenges for development of Novel antimicrobial agents from Ayurvedic medicinal plants to combat the problem of antimicrobial resistance” held at Jadavpur University on 04.07.2018. (Please refer Tag 6/34)
- ✗ 3. This is to declare that I attended as a delegate in the National Seminar on “Clinical Pharmacology – Bench to Bedside” organized by Clinical Research Centre (CRC), Department of Pharmaceutical Technology, held at Jadavpur University on 28.11.2014. (Please refer Tag 6/35)
- ✗ 4. This is to declare that I was an invited speaker on 11.06.2014 for the Refresher Course entitled “Recent Advances & Excellence in Pharmaceutical Sciences” organized by the QIP Nodal Cell (Pharmacy), at Department of Pharmaceutical Technology, Jadavpur University. (Please refer Tag 6/36)
- ✗ 5. This is to declare that I was an invited speaker on for two week long short – term Refresher Course entitled “Directions of Pharma – Research to achieve Pharma –excellence by 2025”organized by the QIP Nodal Cell (Pharmacy),at Department of Pharmaceutical Technology, Jadavpur University between 08.01.2013 to 21.01.2013. (Please refer Tag 6/37)
- ✗ 6. This is to declare that I was an invited speaker on for two week long short – term Refresher Course entitled “Innovation and Excellence in Pharmaceutical Sciences” organized by the QIP Nodal Cell (Pharmacy),at Department of Pharmaceutical Technology, Jadavpur University between 02.07.2013 to 15.07.2013. (Please refer Tag 6/38)
- ✗ 7. This is to declare that I was an invited speaker on for four week long short – term Refresher Course entitled “Future Direction of Pharmaceutical Studies and Research” organized by the QIP Nodal Cell (Pharmacy),at Department of Pharmaceutical Technology, Jadavpur University between 27.06.2012 to 24.07.2012. (Please refer Tag 6/39)
- ✗ 8. This is to declare that I was an invited speaker on for two week long short – term Refresher Course entitled “Drug, Disease and Therapy: A recent advancement”organized by the QIP Nodal Cell (Pharmacy),at Department of Pharmaceutical Technology, Jadavpur University on 18.07.2011 to 21.01.2013. (Please refer Tag 6/40)

- 9. This is to declare that I was an **invited speaker on** for two week long short – term Refresher Course entitled “Drug, Disease and Therapy: A recent advancement”organized by the QIP Nodal Cell (Pharmacy),at Department of Pharmaceutical Technology, Jadavpur University on 04.07.2011. (Please refer Tag 6/41)
- 10. This is to declare that I **participated in** UGC – Sponsored Orientation Programme held at North Eastern Hill University, Shillong from 16.02.2011 to 15.03.2011. (Please refer Tag 6/42)
- 11. This is to declare that I was an **invited speaker on** for two week long short – term Refresher Course entitled “Pharmacy: A Fulcrum of Knowledge of Drug and Drug Research”organized by the QIP Nodal Cell (Pharmacy),at Department of Pharmaceutical Technology, Jadavpur University held from 03.02.2011 to 16.02.2011. (Please refer Tag 6/43)
- 12. This is to declare that I **participated in** UGC – Sponsored Refresher Course, Academic Staff College entitled “Thrust Areas on Development of Natural Products” held at Department of Pharmaceutical Technology, Jadavpur University, Kolkata from 20.11.2008 to 10.12.2008. (Please refer Tag 6/44)
- 13. This is to declare that I **participated in** four week long Refresher Course entitled “Progress in Pharmaceutical Research and Technology”organized by the QIP Nodal Cell (Pharmacy),at Department of Pharmaceutical Technology, Jadavpur University from 18.08.2008 to 13.09.2008. (Please refer Tag 6/45)



(SIGNATURE)

**Tag 6/33**



UNIVERSITY GRANTS COMMISSION  
Human Resource Development Centre (HRDC)  
**Jadavpur University**  
Kolkata

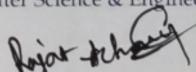


**UGC Sponsored Short Term Course**

This is to certify that... *Ketousetuo Kuotsu*..... *Assistant Professor.III.*.....  
(Name of the Participant) (Designation)

...*Jadavpur University*..... *Kolkata*.....  
(College/University) (Place)

affiliated to.....University, has participated in the Workshop on MOOCs, e-content development and Open Educational Resources from 11th February 2020 to 17th February 2020, organized by School of Media, Communication and Culture and C-MATER, Department of Computer Science & Engineering, Jadavpur University.

  
Director

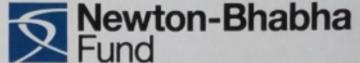
Date: 17th February 2020

*Abhijithroy Subhadip Basu*  
Coordinator



 BRITISH COUNCIL | 70 YEARS IN INDIA

 ROYAL SOCIETY OF CHEMISTRY

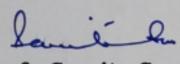
 Newton-Bhabha Fund

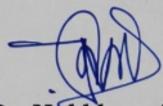
**UK-India Newton Bhabha Fund Researcher Links Workshop**

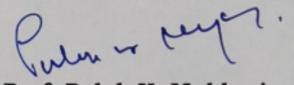
 **School of Health, Sports and Bioscience**  
University of East London  
Stratford Campus, London, UK

 **School of Natural Product Studies**  
Jadavpur University  
Kolkata, WB, India

This to certify that Dr. Ketousetuo Kuotsu from Jadavpur University, Kolkata, India has participated in the UK-India Newton Bhabha Fund Researcher Links Workshop on "Scopes and challenges for the development of novel antimicrobial agents from Ayurvedic medicinal plants to combat the problem of antimicrobial resistance" held at Jadavpur University, Kolkata during September 04 - 07, 2018.

  
**Prof. Samita Sen**  
Dean, Faculty of ISLM, JU

  
**Dr. Mukhlesur Rahman**  
Coordinator, UK

  
**Prof. Pulok K. Mukherjee**  
Coordinator, India

X

Tag 6/35



X  
Tag 6/36



**QIP NODAL CELL (PHARMACY)**  
**DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY**  
**Jadavpur University**  
KOLKATA - 700 032

This is to certify that Dr./Lmt./Shri... Ketan Selvam... Kotsu.....  
has delivered lecture(s) as invited speaker on 11.06.2014.....in the Two / Four Week -  
Long Refresher Course on "Recent Advances & Excellences in Pharmaceutical  
Sciences" of Quality Improvement Programme (Q.I.P) during the period from  
10th June 2014 / 24th June 2014 to 23rd June 2014 / 07th July 2014, under the  
auspices of A.I.C.T.E.

A handwritten signature in black ink.

(B. MUKHERJEE)

Coordinator

QIP Nodal Cell (Pharmacy)  
Department of Pharmaceutical Technology  
Jadavpur University

X

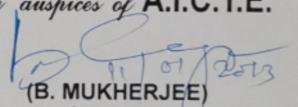
Tag 6/37



QIP NODAL CELL (PHARMACY)  
DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY  
**Jadavpur University**  
KOLKATA - 700 032

This is to certify that Dr. /Smt. /Shri ..... Ketousetu Kuatsu.....

has delivered lecture(s) in the Two Week Long Short-term Refresher Course on "Directions of Pharma-Research to achieve Pharma-excellence by 2025" of Quality Improvement Programme (Q.I.P) during the period from 8th January 2013 to 21st January 2013 under the auspices of A.I.C.T.E.

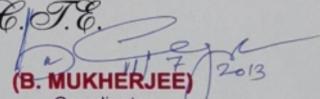
  
(B. MUKHERJEE)  
Coordinator  
QIP Nodal Cell (Pharmacy)  
Department of Pharmaceutical Technology  
Jadavpur University

X  
Tag 6/38



**QIP NODAL CELL (PHARMACY)**  
**DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY**  
**Jadavpur University**  
**KOLKATA - 700 032**

This is to certify that Dr./Smt./Shri.....Ketansetu.....Kotsu.....  
has delivered lecture(s) in the Four Week Long Short - term Refresher Course on  
"Innovation and excellence in Pharmaceutical Sciences" of Quality Improvement  
Programme (D.I.P) during the period from 2nd July 2013 / 16th July 2013 to  
15th July 2013 / 29th July 2013, under the auspices of A. I. C. T. E.

  
**(B. MUKHERJEE)**  
Coordinator

QIP Nodal Cell (Pharmacy)  
Department of Pharmaceutical Technology  
Jadavpur University

X  
Tag 6/39



**QIP NODAL CELL (PHARMACY)**  
**DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY**  
**Jadavpur University**  
KOLKATA - 700 032

This is to certify that Dr. / Mst. / Shri ..... K. Kotsu .....  
has delivered lecture(s) in the Four Week Long Short-term Refresher Course on "Future Directions of Pharmaceutical Studies and Research" of Quality Improvement Programme (Q.I.P) during the period from 27th June, 2012 to 24th July, 2012, under the auspices of A.I.C.T.E.

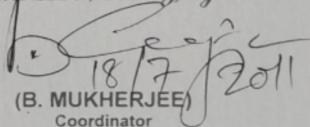
  
**(B. MUKHERJEE)**  
Coordinator  
QIP Nodal Cell (Pharmacy)  
Department of Pharmaceutical Technology  
Jadavpur University

X  
Tag 6/40



QIP NODAL CELL (PHARMACY)  
DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY  
**Jadavpur University**  
KOLKATA - 700 032

This is to certify that Dr./Bmt./Prof.....R. Raychaudhuri  
has delivered lecture(s) as invited speaker on .....18/07/2011..... in the Two / Four Week -Long  
Refresher Course on " Drug, Disease and Therapy : A Recent Advancement" of Quality  
Improvement Programme (Q.I.P) during the period from 28th June 2011 / 4th July 2011 to  
12th July 2011 to 25th July 2011 under the auspices of A.I.C.T.E.

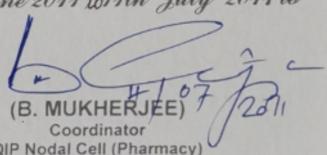
  
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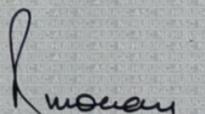
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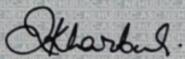
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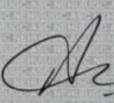
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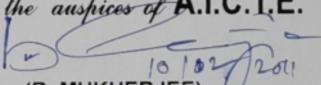
  
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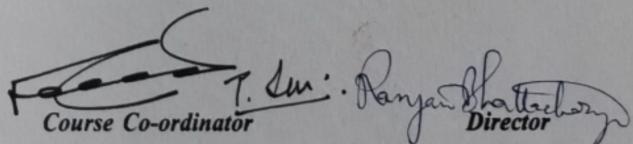
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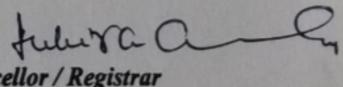
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*participated in the Refresher Course in the subject Thrust Areas  
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# Metronomic chemotherapy of carboplatin-loaded PEGylated MWCNTs: synthesis, characterization and in vitro toxicity in human breast cancer

Suraj Sharma<sup>1</sup> · Sweet Naskar<sup>1</sup> · Ketousetuo Kuotsu<sup>1</sup>

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Tag -7

## Abstract

Our objective of this study is to design and develop a polyethylene glycol (PEG<sub>2000</sub>)-modified multiwall carbon nanotube (PEGylated MWCNT) formulation for oral controlled metronomic chemotherapeutic drug delivery. Multiwall carbon nanotubes undergo various chemical modifications including oxidation with strong acids, conjugation of polyethylene glycol, and coating with cellulose acetate phthalate which resulted in the formation of aqueous dispersion and prevention of drug degradation in acidic environment. Advanced analytical procedure such as Fourier transform infra-red, X-ray diffraction, differential scanning calorimetry, thermal gravimetric analysis, transmission electron microscopy, and dynamic light scattering techniques were used to evaluate physicochemical characterization. We also performed in vitro cytotoxic study by MTT assay and results revealed that carboplatin-loaded PEGylated MWCNTs did not show significant detrimental effect on the viability of MDA-MB-231 (human breast cancer) cells. The maximum encapsulation and drug-loading capacity were determined to be  $71.58 \pm 0.04$  and  $39.62 \pm 0.07\%$ , respectively. The release of carboplatin from PEGylated MWCNTs was investigated at simulated intestinal fluid (SIF), pH 6.8, after optimizing at simulated gastric fluid (SGF), pH 1.2, by enteric coating. Enteric-coated PEGylated MWCNTs exhibit pH-responsive drug activity in a sustained manner especially at pH 6.8. This surface modification strongly suggests that PEGylated MWCNTs could be a potential carrier for metronomic chemotherapeutic agent for high drug resistance, drug with maximum adverse effect and poorly oral bioavailable drugs.

**Keywords** Multiwall carbon nanotubes (MWCNTs) · Cytotoxicity · Metronomic chemotherapeutic · Carboplatin (CP) · MDA-MB-231 cell line · In vitro release

## 1 Introduction

Since 1991, carbon nanotubes (CNTs) have taken in a paradigm shift to boost an intensive range and multidisciplinary nature of drug carrier. CNTs achieve their popularity over therapeutic application because of their high membrane penetrability, different nano-carriers for nano-scale diameter-length, ultralight weight, prolonged circulation time, high aspect ratio, pH-dependent release, rich surface chemistry, biocompatibility and extreme drug cargo capability [1–4]. CNTs are mainly categorized into single-wall carbon nanotubes (SWCNTs) or multiwall carbon nanotubes (MWCNTs) based on layers of cylindrical graphene without overlapping edges [5]. Generally, length of the CNTs range

from 1 to 100 nm with 0.8–2 nm in diameter. However, in some cases, their lengths can vary from 100 nm up to several micrometers with 5–20 nm in diameter [6–8].

However, in spite of CNTs' outstanding properties, their utilization can be minimal due to lack of solubility and poor dispersibility in aqueous solution that lead to aggregation and cause cytotoxicity [9, 10]. Most of these problems can be overcome by the covalent or non-covalent modification of CNTs that improves solubility and dispersibility in aqueous solution [11]. Such binding mostly results from strong  $\pi-\pi$  interactions [8, 12]. Although chemical techniques to create covalent or non-covalent bonding between drugs and CNTs are often limited [8, 13], this obstacle can be overcome by oxidizing CNTs with mixture of concentrated acids (e.g., H<sub>2</sub>SO<sub>4</sub>/HNO<sub>3</sub>). This results in the conjugation of carboxyl group on the surface and the ends of the CNTs that leads to an increase in the range of different chemical moieties that can be further conjugated with hydrophilic co-polymers on CNT

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## REVIEW ARTICLE

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SCIENCE

## Smart and Intelligent Stimuli Responsive Materials: An Innovative Step in Drug Delivery System



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**Abstract:** **Background:** In the field of drug delivery, smart and intelligent approaches have gained significant attention among researchers in order to improve the efficacy of conventional dosage forms. Material science has played a key role in developing these intelligent systems that can deliver therapeutic cargo on-demand. Stimuli responsive material based drug delivery systems have emerged as one of the most promising innovative tools for site-specific delivery. Several endogenous and exogenous stimuli have been exploited to devise "stimuli-responsive" materials for targeted drug delivery.

**Methods:** For better understanding, these novel systems have been broadly classified into two categories: Internally Regulated Systems (pH, ionic strength, glucose, enzymes, and endogenous receptors) and Externally Regulated Systems (Light, magnetic field, electric field, ultrasound, and temperature). This review has followed a systematic approach through separately describing the design, development, and applications of each stimuli-responsive system in a constructive manner.

**Results:** The development includes synthesis and characterization of each system, which has been discussed in a structured manner. From advantages to drawbacks, a detailed description has been included for each smart stimuli responsive material. For a complete review in this niche area of drug delivery, a wide range of therapeutic applications including recent advancement of these smart materials have been incorporated.

**Conclusion:** From the current scenario to future development, a precise overview of each type of system has been discussed in this article. In summary, it is expected that researchers working in this novel area will be highly benefited from this scientific review.

**Keywords:** Stimuli, cargo, endogenous, exogenous, therapeutic, Drug Delivery System.

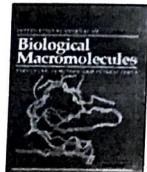
### 1. INTRODUCTION

With the advancement of the technologies in the pharmaceutical field, the drug delivery system has drawn an increasing interest over the last few decades. Nowadays, the emphasis of pharmaceutical galenic research is shifted to the more efficacious drug delivery systems with already existing molecules rather than new drug discovery. Pharmaceutical companies are experiencing obstacles in discovering new medications that represent significant advances for the treatment of disease. Infact, a slow-down is expected in the coming years in the number of really new drug entities that will be developed and actually brought to market. This tendency is already apparent by the limited 'pipeline' of most companies with potential drug candidates. New compounds may be released as orphan drugs, but there is less hope for new entities that will significantly improve the treatment of common

medical conditions and diseases. Thus, an important option is to develop intelligent formulations of existing as well as pipeline medications [1].

With an aim to reduce dosing frequency of immediate release formulations and improve patient compliance along with optimizing drug efficacy or reducing adverse effects, the development of oral drug delivery systems in past decades has been focused on the constant or sustained release. The drug from conventional dosage form, may not reach the disease site in the body due to pre-absorption of the drug i.e. the targeting of the drug cannot be achieved. Thus, the requirement of disease progression based on targeting of the drug is an emergent need for some disease conditions especially for the treatment of cancers of different organs [2-5]. To explore this vision, numerous researches had already been worked out on targeted drug delivery over the conventional method for better treatment of diseased state in patients. Targeted drug delivery system based on nanoparticles [6], nanoliposomes, dendrimers, micelles etc. are the smart carrier systems for the development of smart and intelligent

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## In-vitro and in-vivo evaluation of polymeric microsphere formulation for colon targeted delivery of 5-fluorouracil using biocompatible natural gum katira



Saumen Karan<sup>a</sup>, Souvik Debnath<sup>a,c</sup>, Ketousetuo Kuotsu<sup>b</sup>, Tapan Kumar Chatterjee<sup>a,d,\*</sup>

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### ABSTRACT

The aim was to develop oral site-specific rate-controlled anticancer drug delivery to pacify systemic side-effects and offer effective and safe therapy for colon cancer with compressed dose and duration of treatment. The double emulsion solvent evaporation method was employed. To check functionality, DAPI-staining and in-vivo anticancer study of Ehrlich Ascites Carcinoma bearing mice was tested. Histopathology of liver and kidney and Cell morphology of EAC cell was also performed. Formulated and optimized polymeric microsphere of 5-FU showed excellent physicochemical features. In-vitro, DAPI results pointed drug-treated groups displayed the prominent feature of apoptosis. The percentage of apoptotic of entrapped drug played in a dose-dependent manner. Significant decreases in EAC liquid tumors and increased life span of treated mice were observed. Rate of variation of cell morphology was more in 5-FU loaded microsphere than 5-FU injection. Hematological and biochemical parameter's and Histopathology of liver and kidney resulted that due to control released formulation have slow release rate, that gives less trace on liver and kidney function. Finally, we foresee that polymeric microsphere of 5-FU applying natural gum katira could be an assuring micro-carrier for active colon targeting delivery tool with augmented chemotherapeutic efficacy and lowering side effect against colon cancer.

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### 1. Introduction

Research laboratory and academic institutions in each corner of the World are involved in the development of novel controlled release drug formulation to fight against various life-threatening diseases such as cancer. The chemotherapeutic agent must be able to selectively kill or inhibit the growth of neoplastic cells leaving healthy cells unharmed. It acts like to damage and interferes with DNA synthesis, killing all rapidly dividing cells, both cancerous and healthy [1].

Due to its toxicity, it is essential to provide an effective therapeutic concentration in the target area. As the drug in the proper amount reaches the target area, so the harmful effect is very less. The colon targeted drug delivery system helps the drug to release in the colonic region, and the drug is available at that site reducing the chance of overdose and toxicity problems [2].

In the last few years, a more robust understanding of tumor biology and increased availability of versatile materials, including polymers [3–7], lipids [8,9], inorganic carriers [10], polymeric hydrogels [11,12], and bio-macromolecular scaffolds [13], have pointed to the development of systems that can deliver chemotherapeutics to tumor sites with enriched therapeutic efficacy.

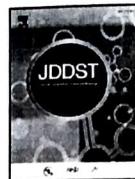
Immense possibilities exist for using advanced drug delivery systems for cancer medications. One such formulation type that has already established to satisfy its promise is microencapsulated delivery systems. The terminology adopted to define microparticulate formulations can sometimes be contradictory and confusing to scholars unfamiliar with the field. Primarily, the term "microparticle" indicates a particle with a diameter of 1–1000 µm, irrespective of the specific interior or exterior structure. Within the large section of microparticles, "microspheres" refers explicitly to spherical microparticles, and the sub-category of "microcapsules" applies to microparticles that have a core enclosed by a material which is precisely different from that of the core. The core may be solid, liquid, or even gas (Fig. 1) [14–18].

In our previous paper entitled [19], Polymeric Microsphere Formulation for Colon Targeted Delivery of 5-Fluorouracil Using Biocompatible Natural Gum Katira has been sketched that natural gum katira was

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## Review article

# A review on carbon nanotubes: Influencing toxicity and emerging carrier for platinum based cytotoxic drug application



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## ARTICLE INFO

**Keywords:**  
Carbon nanotubes  
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## ABSTRACT

Carbon Nanotubes (CNTs) have been frequently acquired as one of the fascinating and advanced nanocarriers for drug delivery and many potential applications due to its unique physicochemical properties. CNTs provided the high surface area for maximum drug loading capacity and ability to cross mammalian cell membranes and allow flexible nature through incorporating assorted functional groups and focused molecules at the constant time. However, an excessive amount of CNTs trigger undesirable toxicity at the sub-atomic cell and animal species which have been reported by many researchers. Despite that, available toxicological concerning about CNTs remains contradictory. Consequently, a systematic understanding of CNT toxicity is required. This review highlighted how several important factors (such as length, diameter, impurities, aggregation, protein corona, and surface modification) that can influence possible toxicological implications. In addition, we conclude the paper by outlining the development of various CNTs conjugated platinum (anti-cancer) drug, profitable for biomedical application and challenges involving CNTs based formulations.

## 1. Introduction

CNTs are hollow cylinders of sp<sub>2</sub> hybridized carbon atoms that are basically rolled tubes of graphite terminated by two end caps [1]. Its unique intrinsic physico-chemical properties make them potential and most versatile candidate for biomedical applications [2–8]. High mechanical strength, intense electrical properties, extreme-light weight, strong thermal conduction and huge surface area, reflected CNTs as an ideal tools utilized in the field of materials science [9]. CNTs have also emerged as optical biosensors and novel electronic device to recognized the biomolecules, such as peptide, nucleic acid, cells, proteins and microorganisms [10–12]. Even, most frequently used cytotoxic agents are often required to improve their solubility, rapid clearance, ability to cross cell membranes, limited biodistribution and receptor-type conjugates that lead to a targeted organ [13–15]. These types of problems encouraged to the study of various chemical modifications of CNTs act as vectors for the selective administration of cytotoxic drugs. However, several investigations has satisfactorily demonstrated the CNTs-based anticancer drugs delivery that would exhibit lower cytotoxicity, sustained drug release and beneficial for tumor targeted delivery. The inherent physical properties of CNTs also consist of strong optical absorption within the near-infrared [16] photoluminescence [17,18] Raman scattering [19,20], echogenicity [21] and photoacoustic

properties [22] can be used to visualize and monitor the CNTs in biological system. As a result, CNTs demand is uprising day by day, due to increase in the advancement of CNTs applications along with flourishing technology.

Subsequently, the effect of CNTs toxicity on living organisms has been a key issue because of certain traits such as length, diameter, surface area, agglomeration tendency, presence of proteins, nature of catalytic metal impurities and chemical used for the modification of CNTs [23]. In general, contamination of metal impurities by catalyst residue is unpreventable during CNTs synthesis. Therefore, it may be necessary to understand the consequences of these metallic contaminants. The curve surface and the surface area are greatly modulated by protein adsorption on the outer diameter and surface chemistry of the CNTs [24,25]. While the structure of protein corona originate in the form of macromolecules after suspended in biological media can altered the characteristic properties of material that create negative impact on biological system. The acutely small size, thread-like shape, broad surface area, and different chemical modification of CNTs are greatly influence their chemical and physical characteristics and boost their potential hazards to humans. The worldwide scientists are attracted with certain complications particularly, the health and safety issue of CNTs. Therefore, it is essential to understand the toxicological characteristics of CNTs after human exposure to them [26,27]. The

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## A smart gelatin nanoparticle for delivery of metoprolol succinate: A strategy for enhancing the therapeutic efficacy by improving bioavailability



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### ARTICLE INFO

**Keywords:**

Gelatin nanoparticles  
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Bioavailability  
Nanoprecipitation  
Therapeutic efficacy

### ABSTRACT

The purpose of this study was to develop and evaluate of gelatin nanoparticles (GNPs) by nanoprecipitation method to increase metoprolol succinate (MES) peroral bioavailability. Prepared GNPs were evaluated in terms of its properties such as particle size, zeta potential, entrapment efficiency, drug loading, *in vitro* drug release, morphology and *in-vivo* pharmacokinetic studies. The GNPs showed sustain drug release in phosphate buffer (pH 7.4) while less release in the 0.1 N HCl as compared to plain MES. The *in vivo* pharmacokinetics study on rabbits showed a rise in the bioavailability of the GNPs by 2.27 folds as compared to marketed formulation. FTIR studies performed on the GNPs indicated no drug-polymer interaction. Nanoparticles (NPs) prepared by nanoprecipitation method were found to be clear (through SEM) and their mean particle size was in the range of  $59.83 \pm 0.14$  to  $156.41 \pm 0.19$  nm. The F-3 formulation exhibited the highest entrapment of  $98.07 \pm 0.53$ . Zeta potential of all GNPs was in the range of 11.66 to 14.50 mV which indicates that they are moderately stable. Release study revealed that GNPs release drug at a sustained rate which assists in the absorption of MES through the blood. Further, *in vivo* studies induced in increased bioavailability of the MES which established the potential of developed carrier systems. Thus, it can be concluded that these prepared NPs might be one of the best preparation for the delivery of MES for better therapeutic efficacy.

### 1. Introduction

Metoprolol [(2)-l-isopropylamino-3[4-(2-methoxyethyl) phenoxypropan], a  $\beta_1$ -adrenergic blocker, is used for the treatment of hypertension. It has to be taken many times a day in tablets form because of its short half-life. The plasma peak might cause several adverse effects such as fatigue/headache, hypotension, and dizziness. Moreover, conventional dosage form fails to keep the drug plasma concentration at an optimum concentration for a prolong period of time [1].

Gelatin which is a protein is obtained by the hydrolysis of collagen, is isolated from tendon and ligament of bovine species, and has been commonly used for pharmaceutical applications due to its biodegradability and biocompatibility [2]. Due to several biologically active molecules of gelatin; it has been proven to be one of the best polymers for controlled release drug delivery systems [3]. These controlled delivery systems can be NPs [4]. It is receiving interest as a nano material because of its molecular characteristics and low antigenicity [2].

Initially, the desolvation method was used to prepare GNPs. It has always been a difficult job to prepare stable NPs from gelatin without aggregation during cross linking because of its polyampholytic nature and broad molecular weight distribution [5]. Therefore, different

examiners have used different methods for the preparation of GNPs such as: emulsion/solvent evaporation [6-8], reverse phase preparation [9], inverse mini-emulsion [10], coacervation [11-14], gamma irradiation [15], two-step desolvation [16-18] and nanoprecipitation [5]. Nanoprecipitation is the most recent technique used for the preparation of gelatin nanoparticle. It requires two miscible solvents; one is solvent and the other is nonsolvent [5,19]. The major pitfall of the nanoprecipitation method so far is that it was previously mainly used for NPs formation from hydrophobic polymers. Thus, encapsulating hydrophilic drug, such as MES was always a difficult task [20].

The objective of this study was to develop GNPs of MES and assessed its particle size, zeta potential, morphology, entrapment efficiency, drug loading, *in vitro* drug release and *in-vivo* pharmacokinetic studies. The chemical structure of MES is given in Fig. 1.

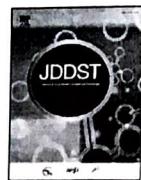
### 2. Materials and methods

#### 2.1. Materials

MES was collected as gift sample from Dr. Ready's Laboratories, Maharashtra, India. Lutrol F68 was received as gift samples from Lupin

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## Chitosan-based nanoparticles: An overview of biomedical applications and its preparation



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### ARTICLE INFO

**Keywords:**

Chitosan nanoparticles  
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### ABSTRACT

Chitosan (CS) is one of the most successfully developed biodegradable polymers. Among the numerous polymers developed to formulate polymeric nanoparticles, CS has fascinated considerable attention due to its appealing properties: (i) biodegradability and biocompatibility, (ii) FDA approval for wound dressings as well as in dietary application, (iii) non-toxicity, (v) scope of sustained release, (vi) probability to modify surface properties and (vii) scope of target nanoparticles (NPs) to particular organs or cells. This review presents different preparation methods of chitosan nanoparticles (CSNPs) from the methodological and mechanistic point of view. The crosslinking agent including aldehyde, tripolyphosphate (TPP), genipin and other cross linkers and the physicochemical behaviour of CSNPs including drug loading, drug release, particles size, zeta-potential and stability are briefly discussed. This review also presents why CS has been chosen to design nanoparticles (NPs) as drug delivery systems in various pharmaceutical applications.

### 1. Introduction

Chitosan, a polysaccharide is composed of  $\beta$ -1, 4 linked 2 amino-2-deoxy-glucopyranose and 2-acetamido-2-deoxy- $\beta$ -D-glucopyranose residues chitin, a biopolymer by alkaline N-deacetylation [1–4]. There are various methods for determination of molecular weight such as HPLC [5], size exclusion chromatography [5,6]. Viscometry is one of the most popular methods to determine molecular weight of CS [7–12]. Solubility plays an important role in the pharmaceutical application of CS. It is a semi-crystalline polymer having strong inter- and intra-molecular hydrogen bonds. CS can be dissolve in various organic acid such as acetic, formic and lactic acid and inorganic acid such as hydrochloric acid. Solubility of CS is influenced on various factors like crystallinity, degree of deacetylation, acetyl group distribution and molecular weight [13,14]. If molecular weight of CS decreased then solubility of CS in acidic medium is increased [15]. Due to reactive amino and hydrogel groups present in CS, the chemical modification of CS is possible. These groups can be readily modified with different variety of ligands, functional groups and moieties to form various CS derivatives like quaternized CS derivatives, thiolated CS derivatives, carboxymethyl CS derivatives and amphiphilic CS derivatives. Example of quaternized

derivatives-trimethyl CS (TMC), dimethyl CS (DEMC), triethyl CS (TEC) [16–23,29–32]. TMC is one of the most successfully developed quaternized derivatives of CS, prepared by the reductive methylation (insertion of methyl iodide and sodium iodide in an alkaline solution of N-methyl Pyrrolidinone (NMP) of CS. DEMC, DEMC and TEC with different substituted N-alkyl groups can be made on TMC synthesis with some modification [24–28]. The synthesis of thiolated CS is done by covalently coupling with sulphydryl bearing agents such as cysteine, thioglycolic acid and glutathione onto the backbone of CS [22,23]. Amphiphilic CS derivatives are synthesized by grafting aliphatic acids (C6-C16) via N-acylation or bile acids/fatty acids through amidating reaction on CS [31,32]. Chitosan with the amino groups becomes a polycation that can subsequently form ionic complexes with a wide variety of natural or synthetic anionic species [36], such as lipids, proteins, DNA and some negatively charged synthetic polymers as poly (acrylic acid) [33–38]. Severe functionalizations can be found along CS backbone by this technique to more extend CS field of applications [39,40]. All these features form CS as good candidate for biomedical applications. Chemical structure of chitosan is given in Fig. 1.

**Abbreviations:** CS, chitosan; NPs, nanoparticles; CSNPs, chitosan nanoparticles; TPP, tripolyphosphate; PEG, polyethylene glycol; O/W, oil-in-water; W/O, water-in-oil; CyA, cyclosporin A; 5-FU, 5-fluorouracil; TMC, N-trimethylchitosan; TCS, thiolated chitosan; SA, sodium alginate; DOX, doxorubicin; TEC, N-triethyl chitosan; DMEC, N, N-dimethyl N-ethyl chitosan; Chitosan-NAC, chitosan-N-acetyl-L-cysteine; TGA, thioglycolic acid; OVA, ovalbumin; HA, Hyaluronic acid; pSEAP, recombinant secreted alkaline phosphatase; TBA, 4-thiobutylamidine; FITC-BSA, fluorescein isothiocyanate labeled bovine serum albumin

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REVIEW ARTICLE

## Chitosan-based nanoparticles as drug delivery systems: a review on two decades of research

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### ABSTRACT

Chitosan (CS) is one of the most functional natural biopolymer widely used in the pharmaceutical field due to its biocompatibility and biodegradability. These privileges lead to its application in the synthesis of nanoparticles for the drug during the last two decades. This article gives rise to a general review of the different chitosan nanoparticles (CSNPs) preparation techniques: Ionic gelation, emulsion cross-linking, spray-drying, emulsion-droplet coalescence method, nanoprecipitation, reverse micellar method, desolvation method, modified ionic gelation with radial polymerisation and emulsion solvent diffusion, from the point of view of the methodological and mechanistic aspects involved. The physicochemical behaviour of CSNPs including drug loading, drug release, particles size, zeta potential and stability are briefly discussed. This review also directs to bring an outline of the major applications of CSNPs in drug delivery according to drug and route of administration. Finally, derivatives of CSNPs and CS nano-complexes are also discussed.

**Abbreviations:** CSF: Cerebrospinal fluid; 5-FU: 5-Fluorouracil; CyA: Cyclosporin A; FITC-BSA: Fluorescein isothiocyanate labeled bovine serum albumin; pDNA: Plasmid deoxyribonucleic acid; CS- NAC: Chitosan N-acetyl-L-cysteine; Glycol CS-TGA: Glycol chitosan thioglycolic acid; CS-TGA: Chitosan thioglycolic acid; CS-TBA: Chitosan S- thiobutyramidine; pSEAP: Recombinant secreted alkaline phosphatase; OVA: Ovalbumin; Thiolated HA: Thiolated hyaluronic acid; SVN: Survivin; SiRNA: Small interfering ribonucleic acid.

### Introduction

Biodegradable polymeric nanoparticles (NPs) can act as efficient drug delivery vehicles for controlled and targeted drug [1]. Chitosan (CS) is a polysaccharide, used as NPs in the pharmaceutical field since two decades ago [2]. CS is a biodegradable, biocompatible and non-toxic biopolymer, made up of  $\beta$ -1 → 4 linked 2-amino-2-deoxy-glucopyranose and 2-acetamido-2-deoxy- $\beta$ -D-glucopyranose residues. Chitin, a biopolymer extracted from the exoskeleton of crustaceans, such as crabs and shrimp is used to prepare CS, is produced by alkaline N-deacetylation [3–5]. CS shows its antibacterial activity only in an acidic medium above pH 6.5 [6].

### Source and physicochemical properties of CS

CS is a polysaccharide composed of  $\beta$ -1, 4-linked D-glucosamine residue. It is derived from the deacetylation of chitin, a naturally occurring polymer found in the exoskeletons of crustaceans and insects [6]. CS has been officially agreed by FDA for the use of wound dressings as well as in dietary applications in Japan, Italy and Finland [7]. It is produced on a commercial scale by exhaustive deacetylation of chitin with the concentrated solution of sodium hydroxide [8,9]. CS, a non-antigenic hydrophilic polymer, containing one amino group and two hydroxyl groups in the restating hexosaminic residue [10,11]. The amino groups make CS a natural polyelectrolyte that readily dissolves in an acidic solution. The insolubility of CS in the solution and the degree of acetylation (DA) effect on the density of it. CS possesses a

crystalline structure due to the inter and intra-molecular hydrogen bonds between the hydroxyl and amino groups. Due to the presence of N-acetyl groups, CS shows a slight degree of hydrophobic behaviour [12–18].

### Preparation of chitosan nanoparticles (CSNPs)

CSNPs have been fully recorded in the literature as a carrier system for various drug delivery systems. Since first reported in 1994 by Ohya et al. [19], various techniques have been used to develop CSNPs.

#### Ionic gelation

In this method, firstly, CS is dissolved in an aqueous acidic solution to obtain the cation of CS. After that, this solution is added dropwise to anionic tripolyphosphate (TPP) solution under constant stirring. CS undergoes ionic gelation due to the complexation between polyanion TPP and cationic CS by electrostatic forces and precipitates to form spherical particles [20–36]. The method is schematically represented in Figure 1.

#### Emulsion cross-linking

In this method, firstly, an aqueous CS solution is emulsified in the oil phase to prepare water-in-oil (W/O) emulsion and after that aqueous droplets are stabilised using a suitable surfactant. Then, the stable emulsion is cross-linked with the most versatile cross-

## FABRICATION, CHARACTERIZATION, AND *IN VITRO* EVALUATION OF PEGYLATED GLYCERIDE LABRASOL® NANOSTRUCTURED LIPID CARRIER COMPOSITES OF METHOTREXATE: THE PATHWAY TO EFFECTIVE CANCER THERAPY

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Tag - 14

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### **ABSTRACT**

**Objective:** The objective of the current study is to optimize and evaluate the potential of polyethylene glycolylated (PEG) glyceride Labrasol® nanostructured lipid carrier (NLC) composites of methotrexate (MTX) to achieve enhanced sustained release delivery in cancer treatment.

**Materials and Methods:** MTX-NLC was successfully prepared by hot melt emulsification and probe sonication method for spatial and controlled release of this therapeutic agent.

**Results:** The solubility screening of MTX and lipids resulted in the selection of Monostearin as solid lipid, PEGylated glyceride Labrasol® and olive oil as liquid lipids for the formulation of MTX-loaded NLC composites. Particle size, zeta potential, and polydispersity index of both the composites were confirmed using dynamic light scattering, whereby Labrasol® MTX-NLC showed high entrapment efficiency and drug loading. A spherical particle shape with smooth surface of all the composites was confirmed from the scanning electron microscope and transmission electron microscopy analysis. Labrasol® MTX-NLC showed remarkably increased cytotoxic response, augmented cellular uptake, and low half maximal inhibitory concentration value in MCF-7 cells. *In vitro* release study confirmed that encapsulation of MTX in PEGylated glyceride Labrasol® MTX-NLC resulted in enhanced sustained release of MTX for a period of 48 h.

**Conclusion:** The present study establishes that PEGylated glyceride Labrasol® MTX-NLC can be considered as a promising anticancer delivery system, thereby improving antitumor efficacy of the drug.

**Keywords:** Methotrexate, Nanostructured lipid carrier, Polyethylene glycolylated glyceride, *In vitro* release, MCF-7 cells, Half maximal inhibitory concentration value, Cellular uptake.

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### **INTRODUCTION**

In the current scenario, cancer is one of the most leading causes of morbidity and mortality developing in any commonality at any point of time [1,2]. In addition, the productiveness of the present standard therapies for cancer is insignificant as the cytotoxic agents are highly toxic, low specificity with narrow therapeutic window and demonstrate short biological half-lives [3]. However, due to the origination of highly efficient therapeutic tools, delivery technologies and the availability of improved comprehension on cancer biology lead to remarkable enhancement of cancer survival rate [4].

Methotrexate (MTX), a folate antagonist which competitively binds to dihydrofolate reductase enzyme thereby hampers the growth of the cell and arrests the cell division cycle in G1 phase and S phase (Fig. 1). It is used as a chemotherapeutic agent in the treatment of different tumors such as osteosarcoma, breast cancer, acute lymphoblastic leukemia, and head, neck, and lung cancer [5]. However, MTX has restricted clinical implementations due to its low solubility, short biological half-life, dose-related cytotoxicity, and cellular efflux [6].

A classic therapeutic drug delivery system for cytotoxics must be formulated using the US Food and Drug Administration approved components and has acquired the generally recognized as safe status for both pharmaceutical and medicinal usage [7-9]. Over the past few years, extensive research has been carried out in nanotechnological field comprising polymers or lipids [10]. Profound research has been carried out on nanotechnology in the design and development of potent cytotoxic therapeutic cargo carriers to solve various issues related to

solubility and bioavailability of these therapeutics. These nanoparticles ultimately enhance the therapeutic efficacy by accurately transporting the drug cargo carrying the cytotoxics to the tumors and successfully safeguarding the drug carrier from biological conditions [11,12]. Furthermore, the enhanced permeability and retention effect of the tumor vasculature allows these nanoparticles to passively target the tumor and the suppressed lymphatic filtration allows them to retain at the specific site [13,14].

Lipid-based nanoparticles have been used as an efficient carrier for therapeutics for several years [15,16]. Due to the presence of biodegradable and biocompatible natural ingredients, these nanocomposites have greatly achieved importance as feasible substitutes to the polymeric nanoparticles [17]. These nanoparticles possess unique physicochemical characteristics, for which it can be prepared easily with the use of melt emulsification method of the lipids and subsequent recrystallization, thus circumventing the usage of possibly harmful organic solvents which are frequently used in polymeric nanoparticle formulations [18,19].

Among various categories of lipid nanoparticles available, the nanostructured lipid carriers (NLCs) comprising mixture of both solid and liquid (like dispersed oils in triglycerides) lipids are considered as the latest or second generation of lipid-based nanoparticle [20,21]. It possesses increased encapsulation efficacy in comparison to the first-generation solid lipid nanoparticles (SLNs) due to the presence of unstructured matrix emerged by the addition of liquid lipid to the solid lipid matrix which curbs the expulsion of therapeutics [22-24]. NLCs

## Review Article

# Strategies in overcoming the challenges of cytotoxic agents using smart colloidal solid lipid nanoparticles and nanostructured lipid carriers - A review

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### Abstract

Cancer is one of the most leading causes of morbidity and mortality worldwide causing 9.6 million deaths in 2018. However, for a variety of cancers the efficacy of current standard treatments is suboptimal. For, most of the cytotoxics are highly toxic which restrains their use in cancer treatment. Second, almost all cancer treatments lack specificity, affecting both the cancerous cells and their normal counterparts. Finally, hydrophobicity and short half-lives exhibited by a number of chemotherapeutic agents restrict their efficacy. However, application of nanotechnology has led to the development of effective nanosized drug delivery systems known commonly as nanoparticles. Amid the different lipid based oral delivery systems. Solid lipid nanoparticles (SLN) and Nanostructured lipid carriers (NLC) specifically, have shown to be quite effective in manifesting the potentiality to: a) enhance selectivity of cytotoxics b) reduce the cytotoxicity to normal tissues c) improving the solubility of hydrophobic cytotoxics and d) offer a sustained and controlled release of agents. The current review summarizes the strategies using SLN's and NLC's in overcoming the challenges and enhancement of anticancer efficacy of cytotoxic agents to specific tumor targeting, including active and passive targeting, long circulating and MDR reversing.

**Keywords:** Cytotoxic agents, solid lipid nanoparticles, nanostructured lipid carriers, intracellular lipid transfer, tumor targeting

### Introduction

Globally, cancer is the second leading cause of death, nearly 1 in 6 deaths is due to cancer. The increasing global burden of cancer and worldwide prevalence in the last decade, posed an extraordinary threat to the healthcare society. As per the recent WHO statistical report, around 45% enhancement in the global cancer mortality rate by 2030, of which 70% would be from developing countries like India (Plummer et al., 2016). Over the past two decades, great effort had been undertaken in order to ameliorate cancer therapy. Chemotherapy plays a major role in the malignancy treatment which is metastasized (Roland, 2007). Conventionally, cancer chemotherapy has focused on the identification and isolation of cytotoxic agents which includes

antimetabolites, topoisomerase inhibitors, alkylating drugs, plant alkaloids, cytotoxic antibiotics, and other antineoplastic agents (Boyle and Levin, 2008; Mesri et al., 2014). Most of these cytotoxic agents can cause mitosis impairment, thus, effectively targeting the rapid cell division. As tumor cells undertake high rate of growth fractions, they are more sensitive to chemotherapy (Roland, 2007). But, unfortunately these agents are also effective in targeting the healthy cells. Owing to the low specificity, these cytotoxic agents are inclined to have a narrow therapeutic window with high dose limiting toxicities. Additionally, they are traditionally administered near to their maximum tolerated dose (Pérez-Herrero and Fernández-Medarde, 2015). The above factors critically restrict the clinical applications of the cytotoxic agents. Consequently, a great deal of attention is being dedicated for the improvement of the antitumor efficacy and safety profile of the anticancer drugs, and exploring alternative methods for delivery of both old and new therapeutic agents.

Cancer Nanotechnology is an emerging field of research with

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## Research Article

# Chronotherapeutically Modulated Pulsatile System of Valsartan Nanocrystals—an *In Vitro* and *In Vivo* Evaluation

Nikhil Biswas<sup>1</sup> and Ketousetuo Kuotsu<sup>1,2</sup>

Received 11 January 2016; accepted 26 February 2016; published online 9 March 2016

**Abstract.** The objective was to improve the dissolution of valsartan by developing valsartan nanocrystals and design a pulsed release system for the chronotherapy of hypertension. Valsartan nanocrystals were prepared by sonication—anti-solvent precipitation method and lyophilized to obtain dry powder. Nanocrystals were directly compressed to minitablets and coated to achieve pulsatile valsartan release. Pharmacokinetic profiles of optimized and commercial formulations were compared in rabbit model. The mean particle size and PDI of the optimized nanocrystal batch V4 was reported as 211 nm and 0.117, respectively. DSC and PXRD analysis confirmed the crystalline nature of valsartan in nanocrystals. The dissolution extent of valsartan was markedly enhanced with both nanocrystals and minitablets as compared to pure valsartan irrespective of pH of the medium. Core minitablet V4F containing 5% w/w polyplasdone XL showed quickest release of valsartan, over 90% within 15 min. Coated formulation CV4F showed two spikes in release profile after successive lag times of 235 and 390 min. The pharmacokinetic study revealed that the bioavailability of optimized formulation (72.90%) was significantly higher than the commercial Diovan tablet (30.18%). The accelerated stability studies showed no significant changes in physicochemical properties, release behavior, and bioavailability of CV4F formulation. The formulation was successfully designed to achieve enhanced bioavailability and dual pulsatile release. Bedtime dosing will more efficiently control the circadian spikes of hypertension in the morning.

**KEY WORDS:** anti-solvent precipitation; chronotherapy; HPLC method validation; pharmacokinetic parameters; valsartan nanocrystals.

## INTRODUCTION

Hypertension is one of the most common lifestyle diseases today, where one of every third person suffers (1). Ambulatory blood pressure monitoring (ABPM) trials has confirmed circadian phase dependant pattern in blood pressure (BP). In persons with normal BP and uncomplicated essential hypertension, BP declines to lowest levels during nighttime sleep, rises abruptly with morning awakening, and attains near peak or peak values during the first hours of diurnal activity. So, the importance of the time of administration of antihypertensive drugs is impeccable. But the issue has only been occasionally addressed and the design of a potential formulation system is at its very early stage (2–4).

Valsartan is a promising member in ARB (angiotensin II receptor blockers) which is effectively used to treat hypertension (5). Hermida *et al.* (4) showed that the administration of valsartan at bedtime more effectively controls blood pressure in essential hypertensive patients than morning dosing.

Despite all its benefits over conventional dosage forms, a very few reports were published on chronotherapeutic formu-

lations of valsartan. Nayak *et al.* (6) and Sokar *et al.* (7) successfully designed capsule-based and core-in-cup tablet for chronotherapeutic delivery of valsartan, respectively. Shah *et al.* addressed the solubility issue of valsartan chronotherapeutic devices and improved the solubility and dissolution profile by beta-cyclodextrin complexation (8). But still now no reports were available regarding the pharmacokinetic behavior of such type of formulations.

Valsartan (class II drug) has shown only 26% oral bioavailability due to its poor aqueous solubility (9,10). Dissolution and bioavailability of valsartan may be improved by reducing particle size and increasing the surface area (11,12).

Different techniques have been employed to reduce the particle size of poorly soluble drugs (13,14). Among these the nanocrystal technology which is relatively new and more promising have been implemented in this study to improve the dissolution of valsartan. Nanocrystals are superior to other techniques because nanonization increases the surface area by many folds and attains thermodynamically more stable crystalline form (15).

So, in the present work an attempt was made to improve the dissolution of valsartan by transforming it to valsartan nanocrystals and compressed into minitablet dosage form for the chronotherapy of hypertension. Nanocrystals was developed by anti-solvent precipitation method employing an ultrasonicator. The capability of ultrasound energy to reduce

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## ORIGINAL ARTICLE

# Development and *in vitro/in vivo* evaluation of controlled release provesicles of a nateglinide–maltodextrin complex



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## KEY WORDS

Provesicles;  
Niosomes;  
Maltodextrin;  
Nateglinide;  
*In vitro* release;  
Goat intestinal permeation;  
Hypoglycemic

**Abstract** The aim of this study was to characterize the provesicle formulation of nateglinide (NTG) to facilitate the development of a novel controlled release system of NTG with improved efficacy and oral bioavailability compared to the currently marketed NTG formulation (Glinate™ 60). NTG provesicles were prepared by a slurry method using the non-ionic surfactant, Span 60 (SP), and cholesterol (CH) as vesicle forming agents and maltodextrin as a coated carrier. Multilamellar niosomes with narrow size distribution were shown to be successfully prepared by means of dynamic laser scattering (DLS) and field emission scanning electron microscopy (FESEM). The absence of drug-excipient interactions was confirmed by Fourier transform infrared spectroscopy (FT-IR), differential scanning calorimetry (DSC) and X-ray diffraction (XRD) studies. *In vitro* release of NTG in different dissolution media was improved compared to pure drug. A goat intestinal permeation study revealed that the provesicular formulation (F4) with an SP:CH ratio of 5:5 gave higher cumulative amount of drug permeated at 48 h compared to Glinate™ 60 and control. A pharmacodynamic study in streptozotocin-induced diabetic rats confirmed that formulation F4 significantly ( $P<0.05$ ) reduced blood glucose levels in comparison to Glinate 60. Overall the results show that controlled release NTG provesicles offer a useful and promising oral delivery system for the treatment of type II diabetes.

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## In Vitro Evaluation of pH Responsive Doxazosin Loaded Mesoporous Silica Nanoparticles: A Smart Approach in Drug Delivery

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**Abstract:** **Objective:** To develop a pH responsive drug delivery system (DDS) for controlled release of therapeutic cargo, Doxazosin Mesylate (DZM) which was loaded into carrier material mesoporous silica nanoparticle (MSN) and subsequently coated with Eudragit S-100(ES-100) to release the drug at pH 7.4.

**Material and Methods:** We have synthesized cylindrical MSN under acidic condition using non-ionic surfactant (Pluronic® P 123) and Tetraethoxysilane (TEOS). After post synthesis treatment (PST) surfactant was removed by calcination. To obtain pH sensitive release calcined MSN was coated with ES-100 (MSN-DZM-ES100). The Brauner-Emmett-Teller (BET) surface area, adsorption isotherm, t-plot, pore volume of MSN were done in surface area analyzer to characterize different MSN samples (as synthesized, calcined, and coated).

**Result and Discussion:** Highest surface area ( $427.114\text{ m}^2/\text{g}$ ) was observed in case of calcined sample when compared to as synthesized ( $3.1198\text{ m}^2/\text{g}$ ) and coated MSN ( $8.8480\text{ m}^2/\text{g}$ ). Adsorption pore width of final coated sample was  $12.58\text{ nm}$  whereas as synthesized and calcined samples possessed pore width  $36.82\text{ nm}$  and  $7.32\text{ nm}$  respectively. All uncoated and coated MSN samples were further characterized with FESEM, TEM, FTIR. No significant interaction between drug and MSN was found from FTIR studies. The drug loading into coated mesoporous support was found to be 43.7%. *In vitro* studies were done at different pH using Franz-diffusion cell. Results showed significant release at pH 7.4 from MSN-DZM-ES100. Cumulative drug release over a period of 10 hr was 81% at this systemic pH.

**Conclusion:** ES-100 coated mesoporous silica nanoparticle is a smart carrier for pH responsive release of guest molecule.

**Keywords:** Calcination, Eudragit S 100, Franz-diffusion cell, Mesoporous silica nanoparticles, pH responsive coating.

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### INTRODUCTION

DZM is a selective  $\alpha_1$ -antagonist. It is a potent candidate for the treatment of hypertension and benign prostate hyperplasia [1]. To avoid first-dose side effect of DZM like hypotension [2] usual therapy is starting with low dose ( $1\text{ mg/d}$ ) and gradually increased up to the daily maximum recommended dose ( $16\text{ mg/d}$ ) [3]. To improve inconvenience of therapy and to minimize the side effects of DZM several studies have been performed to produce controlled release dosage forms of DZM [4, 5]. Among several exciting controlled release DDS of DZM multiunit dosage forms such as pellets or beads and single unit dosage form like tablets have attracted lot of attention. In comparison with a single unit dosage form, multi unit dosage forms have several advantages [6-8] like reduction in peak plasma fluctuation, dose dumping often associated with single unit dosage forms [9]. In addition, multi unit dosage form contains more than one therapeutic component. Recently a DZM based chronotherapeutic tablet system has been developed in our laboratory [10]. However, no report has been published on nanoparticle based controlled release formulation of DZM. To avail

therapeutic benefit in early morning blood pressure (BP) surge often associated with hypertensive patients this nanoparticle based chronotherapeutic system of DZM has developed. Night time administration of this formulation will maximize therapeutic effect of DZM in morning to impede BP surge. Among nanoparticles different MSNs and their therapeutic applications have been studied extensively for the last few years. Some unique features of MSNs have made it an excellent candidate in the biomedical field. Till date many smart DDS like liposome, block copolymers, inorganic material, dendrimers have been developed as drug carrier in controlled drug delivery system [11]. Among them MSNs, the promising inorganic supports have gained much attention due to its highly ordered pore structures, large pore volume and surface area, high loading, zero premature release, controlled release of drug molecules, cell specificity and biocompatibility [12]. Moreover, adjustable pore size has made it a promising carrier as it can accommodate guest molecule which provides a physical encasement for protecting the therapeutic cargo from denaturation and degradation [13].

To the best of knowledge, most reported polymer-MSN hybrids have been synthesized by three methods- layer-by-layer technique [14], graft-to [15], and graft-from technique [16]. Defiance of their novelty these approaches still possess

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## RESEARCH ARTICLE

# pH responsive cylindrical MSN for oral delivery of insulin-design, fabrication and evaluation

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### Abstract

**Objective:** The objective of the present study was to develop novel PMV [poly (methacrylic acid-co-vinyl triethoxysilane)]-coated mesoporous silica nanoparticles (MSN) with improved hypoglycemic effect for oral insulin (INS) delivery.

**Methods:** MSN was synthesized under acidic condition using Pluronic® P 123 and Tetra ethoxy orthosilane. Surfactant was removed by calcination. Calcined MSN was coated with pH sensitive polymer PMV. Cytotoxicity of this coated MSN was evaluated by MTT assay using CHO-K1 cell line. Different MSN samples were characterized with BET surface area analyzer, FESEM, TEM, FT-IR, XRD, TG-DTA. *In vivo* study was performed using male rats. Pharmacokinetic study was conducted using HPLC.

**Results and discussion:** Highest surface area ( $304.3921\text{ m}^2/\text{g}$ ) was observed in case of calcined sample. Adsorption pore width of final coated sample was highest (64.7844 nm) compared with others. No noticeable cytotoxicity was observed for this coated support. The entrapment efficiency of insulin was found to be 39.39%. *In vitro* studies were done at different pH using Franz-diffusion cell. Results showed significant release at pH 7.4. Cumulative drug release over a period of 6 h was more than 48% at this systemic pH. Effect of this MSN-PMV-INS on blood glucose level was retained for 16 h. This novel formulation has shown 73.10% relative bioavailability of insulin.

**Conclusion:** A novel-coated mesoporous silica support was successfully developed for delivery of insulin through oral route.

### Introduction

Oral delivery of protein and peptide drugs still remains a fascinating challenge to parenteral delivery due to its significant challenge to the biomedical researchers worldwide. Enzymatic degradation, low permeability, acidic environment of stomach, rapid clearance of GI tract are major glitches in this context (Mabato et al., 2003; Shen, 2003; Thompson et al., 2010). Insulin, a dual chain therapeutic peptide, is the drug of choice for treatment of patients with type-I diabetes. On the other hand, when it is administered orally less than 0.1% reaches the systemic circulation due to its enzymatic degradation during the passage in the GI tract (Lowman et al., 1999). Several scientific investigations have been carried out to increase the bioavailability through oral route as it is still the most convenient and safe route of administration. Currently, subcutaneous route is the only option available for insulin dependent diabetic patients. Many smart attempts have been made by researchers for improving insulin absorption after oral administration. To date, many structurally stable Drug

Delivery System (DDS), such as dendrimer (Shen et al., 2010), liposome (Hosta-Rigau et al., 2010), inorganic nanomaterials (Urbina et al., 2008), hydrogel microparticles (Raghavendra et al., 2011a) etc. have proved great potential in this field. Among them mesoporous silica nanoparticle (MSN) has showed promising result for immobilization of therapeutic biomolecules (Wong et al., 2004; Lee et al., 2005). This novel DDS has attracted lot of interest due to its high surface area, pore volume, stability and excellent biocompatibility (Stein et al., 2000; Vallet-Regí & Balas, 2006).

Earlier MSN-based DDS was designed according to morphological and physical properties of porous support. However, in these systems physically adsorbed guest molecule would release instantaneously after administration, which would produce undesirable adverse effects to normal cells. Therefore, it is highly desirable to design a "smart" DDS, which can release the entrapped cargo at proper site in a controlled fashion upon exposure to certain stimuli. Many successful attempts including gate keeping strategy have been applied to produce stimuli responsive MSN-based DDS. From dendrimer to quantum dot (Lai et al., 2003; Radu et al., 2004), many gatekeepers have explored to cap the pore of MSN for preventing undesirable leaching of cargo from the porous inorganic support. However, most of these systems are

### Keywords

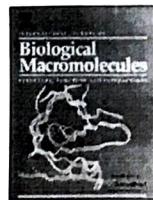
Mesoporous silica nanoparticles, poly (methacrylic acid-co-vinyl triethoxysilane) (PMV), encapsulation, pharmacokinetics, hypoglycemic profile

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# Pulse release of doxazosin from hydroxyethylcellulose compression coated tablet: Mechanistic and *in vivo* study

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Hydroxyethylcellulose based matrices for pulsed release

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## ABSTRACT

Chronotherapeutically programmed hydroxyethylcellulose (HEC) based compression coated doxazosin tablets were prepared and the influence of disintegrants croscarmellose sodium, L-hydroxypropylcellulose (L-HPC), gellan gum on drug release and *in vivo* performance were investigated. Infrared spectroscopy and differential scanning calorimetric studies did not indicate any excipient incompatibility in the tablets. The disintegrants induced a continuous water influx resulting in a rapid expansion of the membrane. The subsequent formation of fractures into the coats leads to a fast drug release after an initial lag time. Release rates indicated that croscarmellose sodium and L-HPC were directly proportional to their concentration in the formulations. *In vitro* optimized croscarmellose sodium–HEC matrix showed significantly faster ( $p < 0.05$ ) drug release ( $t_{90\%} = 46$  min) after an initial lag of 243 min. Disintegrant-HEC blended matrices were found significantly superior ( $p < 0.05$ ) in terms of *in vitro* release and bioavailability in comparison to plain HEC matrices. Drug release kinetics followed modified power law and Weibull model ( $r > 0.99$ ). The mechanism involved in release was anomalous transport and super case II transport with matrix swelling. The pulsatile tablets showed no changes either in physicochemical appearance, drug content or in dissolution pattern during its accelerated stability studies.

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## 1. Introduction

Hypertension is responsible for strokes, heart attacks and other vascular and renal complications [1]. The variety of biological variables which affects blood pressure (BP), including plasma renin, angiotensin converting enzyme, aldosterone, atrial natriuretic peptide and catecholamines has shown circadian pattern in their activity [2]. The physiological changes in biological variables during the 24 h period give rise to the circadian pattern in BP. Generally BP shoots up with morning awakening and reaches peak level during the first hour of daily activity. Sustaining the level till afternoon it slowly falls down and attains lowest value during nighttime sleep. Pulsatile drug delivery systems aims to match drug release rate to the biological requirement of hypertensive therapy and thus to manage hypertension better while minimizing treatment side effects. The characteristic feature of this formulation is to be a defined lag time followed by a drug pulse, with the enclosed active quantity being released in a kind of 'Big Bang' [3].

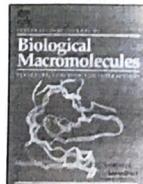
Doxazosin mesylate is a long acting selective inhibitor  $\alpha$ -adrenergic receptor which is effective and well tolerated in

essential hypertension. Doxazosin GITS formulation (controlled-release gastrointestinal therapeutic System) is already marketed and proved to be well tolerated and more effective in essential hypertension than standard doxazosin tablets [4]. However no effort has been made to develop a chronotherapeutic tablet system for doxazosin mesylate which upon night time administration will maximize the therapeutic benefits of doxazosin in early morning when body suffers most due to hypertension. We try to develop such a system in a very cost effective manner.

Most pulsatile drug delivery systems are single unit devices coated with inner swellable layer and outer rupturable layer [5]. Being relatively complex system their large scale manufacturing requires a lot of technological advancements and skills. To simplify this technology, the inner swellable coating has been replaced by a swellable core consisting of swelling polymer HEC and different disintegrants like croscarmellose sodium, L-HPC (L-hydroxypropylcellulose), gellan gum. In the present work we designed directly compressible tablets of doxazosin compression coated with a single rupturable outer layer with an intention of providing pulse release during the vulnerable period of 3 am to noon upon administration at around 11 pm. The focus was to develop the system in a cost effective manner and maximize therapeutic benefits of doxazosin. Compression coating technology is very simple, inexpensive and it is not hazardous to environment since

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Tag -21



## Recent advancement of gelatin nanoparticles in drug and vaccine delivery



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Gelatin nanoparticles  
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### ABSTRACT

Novel drug delivery system using nanoscale materials with a broad spectrum of applications provides a new therapeutic foundation for technological integration and innovation. Nanoparticles are suitable drug carrier for various routes of administration as well as rapid recognition by the immune system. Gelatin, the biological macromolecule is a versatile drug/vaccine delivery carrier in pharmaceutical field due to its biodegradable, biocompatible, non-antigenicity and low cost with easy availability. The surface of gelatin nanoparticles can be modified with site-specific ligands, cationized with amine derivatives or, coated with polyethyl glycols to achieve targeted and sustained release drug delivery. Compared to other colloidal carriers, gelatin nanoparticles are better stable in biological fluids to provide the desired controlled and sustained release of entrapped drug molecules. The current review highlights the different formulation aspects of gelatin nanoparticles which affect the particle characteristics like zeta potential, polydispersity index, entrapment efficacy and drug release properties. It has also given emphasis on the major applications of gelatin nanoparticles in drug and vaccine delivery, gene delivery to target tissues and nutraceutical delivery for improving the poor bioavailability of bioactive phytonutrients.

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### Contents

1. Introduction .....	318
2. Chemistry of gelatin .....	318
3. Methods for preparation of CNPs .....	318
3.1. Two-step desolvation .....	318
3.2. Simple coacervation .....	319
3.3. Solvent evaporation .....	319
3.4. Microemulsion .....	319
3.5. Nanoprecipitation .....	319
3.6. Self-assembly .....	319
3.6.1. Chemical modification .....	320
3.6.2. Simple mixing .....	320
4. Characteristics of CNPs .....	320
4.1. Particle size .....	320
4.1.1. Effect of cross-linker concentration .....	320
4.1.2. Effect of temperature .....	321
4.1.3. Effect of desolvating agent .....	321
4.1.4. Effect of pH of the solution .....	321
4.2. Drug loading and entrapment efficacy .....	321
4.3. Drug release .....	322

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Tag - 22

## Review Article

# Nonionic Surfactant Vesicles in Ocular Delivery: Innovative Approaches and Perspectives

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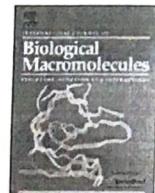
With the recent advancement in the field of ocular therapy, drug delivery approaches have been elevated to a new concept in terms of nonionic surfactant vesicles (NSVs), that is, the ability to deliver the therapeutic agent to a patient in a staggered profile. However the major drawbacks of the conventional drug delivery system like lacking of permeability through ocular barrier and poor bioavailability of water soluble drugs have been overcome by the emergence of NSVs. The drug loaded NSVs (DNSVs) can be fabricated by simple and cost-effective techniques with improved physical stability and enhance bioavailability without blurring the vision. The increasing research interest surrounding this delivery system has widened the areas of pharmaceutics in particular with many more subdisciplines expected to coexist in the near future. This review gives a comprehensive emphasis on NSVs considerations, formulation approaches, physicochemical properties, fabrication techniques, and therapeutic significances of NSVs in the field of ocular delivery and also addresses the future development of modified NSVs.

## 1. Introduction

The body barriers like dynamic, tissue, and ocular blood barriers have presented major challenges to the formulation scientists and pharmacologists in the development of ocular drug delivery for decades. In terms of drug delivery, the eye can be considered to have four target sites: (i) the preocular structures of the front of the eye (e.g., conjunctiva and eyelids); (ii) the cornea; (iii) the anterior and posterior chamber and associated tissues; and (iv) posterior eye segment (e.g., retina and vitreous cavity) (Figure 1). Topical, systemic, periocular, and intravitreal are common routes of drug administration for the treatment of eye disorders and infections. Topical instillation is the most widely preferred noninvasive route of drug administration to treat diseases affecting the anterior segment. Conventional eye drops account for 90% of the marketed ophthalmic formulations. The reason may be attributed to ease of administration and patient compliance [1, 2]. However, in topical drop administration the ocular bioavailability is very low and extensive precorneal loss is caused by tear turnover, nasolacrimal drainage, reflex blinking, and ocular static and dynamic barriers [3, 4]. Hence,

about 1–2% of the drug penetrates cornea and reaches the intraocular tissues after instillation of an eye drop while major portions are absorbed systemically [5, 6]. Due to the presence of blood-aqueous barrier and blood-retinal barrier, systemic administration leads to accumulation of high loading dose at target site which results in unavoidable systemic side effects like stomach upset and disturbed gastrointestinal motility.

In order to overcome the problems of conventional ocular therapy, such as short residence time, impermeability of corneal epithelium, and frequent instillation and ocular drug delivery barriers, numerous nanocarriers have been developed. Many of the ocular drug delivery systems (e.g., liposomes, micelles, solid lipid, and polymer-based nanoparticles) have reached the late stages of development, and some of them were approved but due to blurred vision or lack of patient compliance, they have not been universally accepted. As a result, drug delivery system has been enriched by the introduction of novel vesicles which improved both permeability and bioavailability of poorly water soluble drugs [7]. Inspired by the unique properties of NSVs, our review expands on the versatility and flexibility of NSVs and how such nanostructures can be used for therapeutic purposes.



## Maltodextrin based proniosomes of nateglinide: Bioavailability assessment

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### ABSTRACT

The present study delineates the fabrication of maltodextrin based proniosomes of nateglinide and their potential as controlled delivery system for diabetic therapy. New Zealand albino male rabbits have been used as animal model for *in vivo* study. To evaluate the bioavailability of nateglinide proniosome, a rapid, simple and sensitive HPLC method with photodiode array detection was developed and validated to determine nateglinide in rabbit plasma. Chromatographic separation was achieved by a reverse phase C<sub>18</sub> column using a mixture of acetonitrile:methanol:10 mM phosphate buffer (pH 3.5) in the ratio of 56:14:30 (%v/v) as the mobile phase at a flow rate of 1.0 ml/min and quantified based on drug/IS peak area ratios. Gliclazide was used as the internal standard. The intra- and inter-day relative standard deviations of four tested concentrations were below 2%. The nateglinide proniosome formulation exhibited significantly higher plasma concentration than those of pure drug. The study revealed that the rate and extent of absorption of nateglinide from the proniosomal formulation was comparatively enhanced that of pure drug. Maltodextrin based proniosomes of nateglinide is not only simple and cost efficient delivery but also offers a useful and promising carrier for diabetic therapy through oral administration.

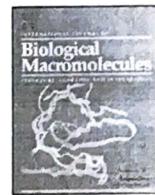
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### 1. Introduction

Nateglinide (NTG) [N-(trans-4-isopropylcyclohexylcarbonyl)-D-phenylalanine] is a novel non-sulfonylurea oral antidiabetic agent has outstanding clinical effectiveness in the treatment of type II diabetes mellitus [1,2] (Fig. 1). It increases the insulin release from pancreatic β-cells through inhibition of ATP-dependent potassium channels. After oral administration, NTG is rapidly absorbed from the gastrointestinal tract and peak plasma concentration reaches at 0.5–1.0 h. Daily dose of nateglinide is about 60–120 mg is required clinically thrice in a day [3,4]. This necessitates the development of controlled release formulation to maintain relatively constant blood levels for longer duration time. Furthermore, nateglinide has low water solubility, of about 8 mg/L Drug low solubility and/or wettability could limit its absorption through the gastrointestinal tract, resulting in low bioavailability and poor dose proportionality [5]. So there is a need to find a new way to enhance the solubility and bioavailability of nateglinide. It is metabolized by cytochrome P-450 system to inactive metabolite and eliminated with half-life of 1.4 h [6].

In recent years, proniosome derived niosomes have received a lot of attention as a drug carrier to improve the therapeutic activity, reduce side effects, and improve stability of drugs by protecting compounds from chemical degradation or transformation [7]. Among the various routes of niosomes administration, the oral route is advantageous for its versatility, safety, and patient compliance. However, less integrity of niosomes at the site of absorption, physicochemical instability, such as hydrolysis, separation of drug from niosomes, sedimentation, and aggregation limited their utilization for oral delivery of drugs [7,8]. Proniosomes are liquid crystalline-compact niosomal hybrid containing water-soluble carrier particles coated with surfactant and can be hydrated to form niosomal dispersion on brief agitation in aqueous media. The use of maltodextrin based proniosomes preparation permitted flexibility in the ratio of surfactant and other components which can be incorporated. The method for preparation of proniosomes includes slurry method and the spraying of surfactant on water-soluble carrier particles. Maltodextrin based proniosome powders offers a simple and stable carriers for efficient oral delivery of lipophilic or amphiphilic drugs. Maltodextrin was used as carrier that produced proniosomes with greater drug loading. Due to high surface area and the porous structure, maltodextrin was chosen a carrier to prepare proniosomes with high surfactant to carrier mass ratios [9].

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## Chronotherapeutic delivery of hydroxypropylmethylcellulose based mini-tablets: An *in vitro*–*in vivo* correlation



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### ABSTRACT

The purpose of the study was to develop and internally validate a nonlinear *in vitro*–*in vivo* correlation model for a chronotherapeutically programmed HPMC based propranolol HCl (PHCl) mini-tablet. A simple and sensitive HPLC method was developed for the determination of PHCl content in rabbit plasma. The influence of tri-sodium citrate (TSC) on release behaviour was investigated through *in vitro* dissolution and *in vivo* absorption. Linear and nonlinear (quadratic, cubic, sigmoid functions) deconvolution based *in vitro*–*in vivo* correlation (IVIVC) models were developed using *in vitro* dissolution data and bioavailability profile. Prediction errors were investigated for  $C_{max}$  and AUC in the light of US FDA guidelines for average percent prediction error. Release rate indicated that TSC was directly proportional to its concentration in the formulation. *In vitro* optimized formulation showed nearly 4.5 h lag time and  $5.24 \pm 1.74\%$  drug releases in initial 4.5 h following rapid release  $97.11 \pm 1.87\%$  in 6 h. The deconvolution based IVIVC model appeared to be curvilinear for all three pulsatile formulations. Among various functions investigated the model using cubic function showed a better correlation ( $r > 0.99$ ) and satisfies the US FDA guidelines for average percent prediction error of less than 10%.

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### 1. Introduction

The living systems are predictable dynamic resonating systems which require different amounts of drug at expected times within the circadian cycle (one oscillation cycle per day) [1]. Suprachiasmatic nucleus, which is located at the base of hypothalamus synchronizes this cycle and controls almost all body function [2]. Circadian phase dependent pattern has been well documented in diseases such as, bronchial asthma, myocardial infarction, angina pectoris, ulcer, diabetes, hypercholesterolemia and hypertension [3]. All these acted as a driving force for the development of pulsatile drug delivery systems. In these systems, there is a rapid and transient release of a certain amount of drug molecules within a short time period immediately after a predetermined off-release period [4].

Hypertension is a common chronic condition affecting up to 35% of human adults [5,6]. In essential hypertension, the relatively constant medication level achieved by conventional antihypertensive agents may be lower than required in the morning, when BP surges to peak or near peak levels; whereas, it may be higher than required during night time sleep, when BP declines, at least in low risk

patients, to their lowest level [7]. So in order to optimize the therapy in terms of safety, patient compliance and efficacy chrono pharmaceutical or pulsatile formulations based upon time controlled drug delivery systems are considered to be potential therapeutic option [8].

Sungthongjeen et al. developed a tablet system consisting of core coated with two layers, an inner swelling layer of croscarmellose sodium and an outer rupturable layer of ethyl cellulose [9]. To simplify this technology, the inner swellable coating has been replaced by a swellable core consisting of swelling polymer HPMC E5 and superdisintegrant croscarmellose sodium (Ac Di Sol). Multivalent ions are known to influence drug release in HPMC matrices [10]. Alderman has reported the highly adverse effects on extended release when high valency salts are incorporated into a HPMC hydrophilic matrix [11]. The lag time and the drug release rate from a rupturable pulsatile tablet can be further modulated by incorporating a multivalent salt tri-sodium citrate in HPMC core.

The food and drug administration (FDA) defines IVIVC as a predictive mathematical model describing relationship between an *in vitro* property of a dosage form and relevant *in vivo* response. The availability of a validated IVIVC reduces the need for expensive bioequivalence study in human [12,13]. There are four levels of IVIVC that have been described in the FDA guidance, which include levels A, B, C, and multiple C. The concept of correlation level is based upon the ability of the correlation to reflect the complete

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ORIGINAL ARTICLE

Tag-25

## Antibacterial and antiviral evaluation of sulfonoquinovosyldiacylglyceride: a glycolipid isolated from *Azadirachta indica* leaves

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**Significance and Impact of the Study:** The water-soluble metabolite sulfonoquinovosyldiacylglyceride (SQDG) isolated from *Azadirachta indica* (Neem) possess significant antibacterial as well as anti-HSV activity. The efficacies as well as the solubility factor of SQDG substantiate a greater attention for its use as phytotherapeutic drug for controlling microbial infections as most consumers have better acceptance of phytomedicines than synthetic drugs.

### Keywords

antimicrobial, antiviral, *Azadirachta indica*, Sulfonoquinovosyl-diacylglyceride.

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### Abstract

Assessment of antibacterial as well as antiherpes virus activity of sulfonoquinovosyldiacylglyceride (SQDG), a glycolipid, isolated from the leaves of *Azadirachta indica* has been described. Antimicrobial activity was evaluated against Gram-positive, Gram-negative bacteria and herpes simplex virus. SQDG showed significant inhibitory activity against *Salmonella typhi* and two isolates of *Shigella dysenteriae* with MIC values  $32 \mu\text{g ml}^{-1}$ , while three isolates of *Salm. typhi*, *Escherichia coli* and *Vibrio cholerae* were inhibited at  $64 \mu\text{g ml}^{-1}$  and have shown zone diameter ranging from 6.2 to 12.3 mm. The growth kinetics study of SQDG on *Salm. typhi* and *Sh. dysenteriae* revealed that the growths were completely inhibited at their MIC values within 24 h of exposure. Interestingly, SQDG inhibits herpes simplex virus (HSV) type 1 and 2 with the EC<sub>50</sub> of 9.1 and  $8.5 \mu\text{g ml}^{-1}$ , compared with acyclovir (2.2 and  $2.8 \mu\text{g ml}^{-1}$  against HSV-1 and HSV-2). The selectivity index (SI) was found to be 12.4 against HSV-1 and 13.41 with HSV-2. Furthermore, the expression of proinflammatory cytokines of HSV-infected and SQDG-treated macrophages using ELISA kit revealed that SQDG significantly downregulated the production of TNF- $\alpha$ , IL-1 $\beta$ , IL-12 and IL-6.

### Introduction

The use of medicinal plants and their compounds as the source of antimicrobial drugs have become more relevant now-a-days due to the growing incidence of drug-resistant pathogens (Samy and Gopalakrishnakone 2010). Moreover, the incidence of recurrent herpes infection, caused by herpes simplex virus type 1 (HSV-1) and 2 (HSV-2), has increased over the past decade, although HSV has been successfully treated with acyclovir since 1970s, but its long-term use yielded drug resistance

(Whitley and Roizman 2001). Thus, the antimicrobial agents constitute an important class of compounds and therefore continue to be an attractive field in antimicrobial therapy.

The plant *Azadirachta indica* A. (Meliaceae) popularly known as neem has attracted attention of the researchers for a long time as it is reported to have several biological activities including antimalarial (Jones *et al.* 1994), immunomodulatory (Van der Nat *et al.* 1987), antifungal (Sundarasivarao and Madhusudhanarao 1977), antibacterial (Rao *et al.* 1986) and so on. As a part of our continuous search



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Tag -26

Contraception

Contraception 88 (2013) 131–140

## Original research article

Search for a potent microbicidal spermicide from the isolates  
of *Shorea robusta* resinYogesh P. Bharitkar<sup>a</sup>, Maitreyee Banerjee<sup>a</sup>, Shrabanti Kumar<sup>a</sup>, Rupankar Pairy<sup>a</sup>,  
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## Abstract

**Background:** An alarming increase in global population is the root cause of poverty, malnutrition, sexually transmitted infections (STIs) and many other social problems. Microbicidal spermicides possessing dual function of contraception and STI protection can effectively combat this problem, and their development is of utmost importance at present.

**Study Design:** A major metabolite isolated from *Shorea robusta* resin was spectroscopically characterized as asiatic acid. Spermicidal efficacy of the isolate was evaluated in vitro by a modified Sander-Cramer test. The mode of spermicidal action was assessed by (a) double fluoroprobe staining, (b) hypoosmotic swelling test and (c) scanning electron microscopy. Antimicrobial efficacy was assessed by disc diffusion and broth dilution methods using human isolates of bacteria (*Escherichia coli* ATCC 25938 and *Pseudomonas aeruginosa* 71) and fungus (*Candida tropicalis*).

**Results:** The minimum effective concentration of asiatic acid that induced instantaneous immobilization of rat spermatozoa in vitro was 125 μg/mL. The mechanism of action involved disruption of sperm plasma membrane. The microbicidal efficacy was found to be moderate for vaginal pathogens, with no effect on normal vaginal flora.

**Conclusion:** Asiatic acid possesses appreciable spermicidal and microbicidal potential and may be explored as an effective microbicidal spermicide.

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Keywords: Asiatic acid; Spermicides; Microbicide; Vaginal contraceptive

## 1. Introduction

With global population exceeding seven billion and pandemic of sexually transmitted infections (STIs) including the dreadful AIDS possessing a constant threat [1], the development of effective, safe and inexpensive contraceptive methods is being increasingly needed. Various physical and chemical methods have been in use to prevent unwanted pregnancies, but until now, none of the approaches can be considered as ideal. Hormone-based methods are considered as foolproof but suffer the drawback of causing undesirable side effects. Gynecologists prefer to prescribe oral contraceptive pills as the safest drugs for preventing unwanted

pregnancies, but they fail to give protection against STIs. Women who use the barrier methods of contraception, e.g., diaphragm, cervical cap, contraceptive sponge and spermicides, however, are at higher risk of vaginal infection, urinary tract infection and possibly toxic shock syndrome. Vaginal contraceptive products that have been available for many years usually contain the membrane surfactant nonoxynol-9 (N-9) as one of the main ingredients [2]. However, the major drawback of using N-9 or other surfactants lies in their detergent-type cytotoxic effect on vaginal cells [3]. Besides, N-9 is also known to inactivate lactobacilli, which form the normal flora in vaginal tissues [4]. Disturbance of the vaginal microflora increases the vulnerability to vaginal infections, which in turn enhances the chances of STI/HIV transmission [5]. Therefore, development of vaginal spermicidal microbicides lacking detergent-type cytotoxicity may offer a significant clinical

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## DRUG DELIVERY BASED ON BUCCAL ADHESIVE SYSTEMS - A REVIEW

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### ABSTRACT

Buccal delivery involves the administration of the desired drug through the buccal mucosal membrane lining of the oral cavity. The objective of this article is to review buccal drug delivery by discussing the structure and environment of the oral mucosa and highlighting the mechanisms of drug permeation and methodology in evaluating buccal formulations. This review also highlights a brief description of advantages, limitations of buccal drug delivery and theories involved in mucoadhesion. Additionally, we discuss on the new generation of mucoadhesive polymers such as thiolated polymers, lectins, followed by the recent mucoadhesive formulations for buccal drug delivery.

**KEYWORDS:** Buccal drug delivery, mucoadhesion, polymers.



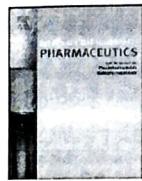
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Tag-28



## In vitro–in vivo correlation and bioavailability studies of captopril from novel controlled release donut shaped tablet

Asim Sattwa Mandal, Sugata Chatterjee, Subhasis Kundu, Nikhil Biswas, Arijit Guha, Sreyashi Paul, Ketousetuo Kuotsu\*

Department of Pharmaceutical Technology, Jadavpur University, Kolkata 700032, West Bengal, India

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### ABSTRACT

A controlled release formulation of captopril which was coated and fabricated into a donut shaped tablet formulation, was investigated in rabbit for pharmacokinetic and *in vitro*–*in vivo* correlation studies. Coated donut shaped tablets were prepared and *in vitro* release was studied in simulated gastric fluid at three different RPMs. New Zealand albino male rabbits have been used as animal model for *in vivo* study. A sensitive and simple HPLC method was developed for the determination of captopril content in rabbit plasma. *In vitro* release studies showed that release patterns followed zero order for around 4 h. Single oral administration of coated donut shaped tablets in rabbit illustrated retained availability of captopril to the injected drug. Captopril content could pursue the same release pattern over the same time course in *in vivo* study. The *in vivo*–*in vitro* correlation coefficients obtained from point-to-point analysis were greater than 99% between concentrations at certain time points obtained from release study in simulated gastric fluid at different RPMs and HPLC analysis of rabbit's plasma. From the *in vitro*–*in vivo* correlation prediction it was evident that the coated donut shaped tablet is a good device for controlled delivery of captopril.

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### 1. Introduction

Captopril (1-[(2S)-3-mercaptopro-2-methylpropionyl]-L-proline), an orally angiotensin-converting enzyme (ACE) inhibitor has outstanding clinical effectiveness in the treatment of essential hypertension and congestive heart failure (El-Kamel et al., 2006; Seta et al., 1988). It is widely used as a first choice drug in antihypertensive therapy. However, single dose of captopril can regulate hypertension up to 8 h. Hence, a daily dose of 37–75 mg is required clinically thrice a day. This necessitates the development of controlled release formulation to maintain relatively constant blood levels for longer duration of time. Furthermore, it possesses good bioavailability (70–75%) including short half-life (~2 h) (Duchin et al., 1988). It is metabolized to *n*-carboxyl derivative in liver and excreted mainly in the urine (Darren et al., 2009; Singhvi et al., 1982).

A new way of ensuring approximately zero order drug release from the matrix is the modification of the geometry of tablet. This approach has been explored by keeping the surface area constant. This leads to semi-hemispheric, frustum-shaped, pie-shaped, multi-holed device, device with a coaxial hole (donut-shape or

doughnut shape) (Kim, 1999). Except donut shaped tablet all other geometrically modified devices are not suitable for industrial manufacturing. In such a tablet, there is a constant ratio between the inner and outer tablet surface areas. This is made possible by the fact that as there is a decrease in the outer surface area of the tablet with progressing time of tablet dissolution, there is concomitant increase in the inner surface area (Higuchi, 1962). For *in vivo* analysis, suitable and sensitive analytical methods are essential for successful clinical, pharmacological and pharmacokinetic evaluation, bioavailability and bioequivalence (Gauhar et al., 2009). Captopril has been determined by several methods including gas chromatography, gas chromatography–mass spectrometry (GC-MS), radioimmunoassay, enzyme immunoassay (Matsuki et al., 1980; Tu et al., 1984; Kinoshita et al., 1986). However, the GC method is limited by sensitivity and the GC-MS may not be widely accessible. The immunological methods have become attractive for routine clinical monitoring during chronic therapy because of their ease of performance, speed of analysis and sensitivity. Among these methods, high-performance liquid chromatography (HPLC) is the most extensively used due to high sensitivity and high selectivity. Shen et al. have developed simple HPLC method for determination of captopril in biological fluids (Shen et al., 1992). By derivatization of captopril a rapid and highly sensitive HPLC method has been developed for determination captopril in plasma. The derivatization enhanced the UV absorption

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Tag - 29

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## Fabrication and *in vitro* evaluation of bidirectional release and stability studies of mucoadhesive donut-shaped captopril tablets

Asim Sattwa Mandal, Sugata Chatterjee, Kazi Masud Karim, Nikhil Biswas, Arijit Guha, Mamata Behera & Ketousetuo Kuotsu

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Tag-30

## REVIEW ARTICLE

# Niosome: A future of targeted drug delivery systems

Kazi Masud Karim, Asim Sattwa  
 Mandal, Nikhil Biswas, Arijit Guha,  
 Sugata Chatterjee, Mamata Behera,  
 Ketousetuo Kuotsu

Department of Pharmaceutical  
 Technology, Jadavpur University,  
 Kolkata - 700 032, West Bengal, India

J Adv Pharm Tech Res

## ABSTRACT

Over the past several years, treatment of infectious diseases and immunisation has undergone a revolutionary shift. With the advancement of biotechnology and genetic engineering, not only a large number of disease-specific biological have been developed, but also emphasis has been made to effectively deliver these biologicals. Niosomes are vesicles composed of non-ionic surfactants, which are biodegradable, relatively nontoxic, more stable and inexpensive, an alternative to liposomes. This article reviews the current deepening and widening of interest of niosomes in many scientific disciplines and, particularly its application in medicine. This article also presents an overview of the techniques of preparation of niosome, types of niosomes, characterisation and their applications.

**Key words:** Bileyer, drug entrapment, lamellar, niosomes, surfactants

## INTRODUCTION

The concept of targeted drug delivery is designed for attempting to concentrate the drug in the tissues of interest while reducing the relative concentration of the medication in the remaining tissues. As a result, drug is localised on the targeted site. Hence, surrounding tissues are not affected by the drug. In addition, loss of drug does not happen due to localisation of drug, leading to get maximum efficacy of the medication. Different carriers have been used for targeting of drug, such as immunoglobulin, serum proteins, synthetic polymers, liposome, microspheres, erythrocytes and niosomes.<sup>[1]</sup>

Niosomes are one of the best among these carriers. The self-assembly of non-ionic surfactants into vesicles was first reported in the 70s by researchers in the cosmetic industry. Niosomes (non-ionic surfactant vesicles) obtained on hydration are microscopic lamellar structures formed upon combining non-ionic surfactant of the alkyl or dialkyl

polyglycerol ether class with cholesterol.<sup>[2]</sup> The non-ionic surfactants form a closed bilayer vesicle in aqueous media based on its amphiphilic nature using some energy for instance heat, physical agitation to form this structure. In the bilayer structure, hydrophobic parts are oriented away from the aqueous solvent, whereas the hydrophilic heads remain in contact with the aqueous solvent. The properties of the vesicles can be changed by varying the composition of the vesicles, size, lamellarity, tapped volume, surface charge and concentration. Various forces act inside the vesicle, eg, van der Waals forces among surfactant molecules, repulsive forces emerging from the electrostatic interactions among charged groups of surfactant molecules, entropic repulsive forces of the head groups of surfactants, short-acting repulsive forces, etc. These forces are responsible for maintaining the vesicular structure of niosomes. But, the stability of niosomes are affected by type of surfactant, nature of encapsulated drug, storage temperature, detergents, use of membrane spanning lipids, the interfacial polymerisation of surfactant monomers *in situ*, inclusion of charged molecule. Due to presence of hydrophilic, amphiphilic and lipophilic moieties in the structure, these can accommodate drug molecules with a wide range of solubility.<sup>[3]</sup> These may act as a depot, releasing the drug in a controlled manner. The therapeutic performance of the drug molecules can also be improved by delayed clearance from the circulation, protecting the drug from biological environment and restricting effects to target cells.<sup>[4]</sup> Niosome made of alpha, omega-hexadecyl-bis-(1-aza-18-crown-6) (Bola-surfactant)-Span 80-cholesterol (2:3:1 molar ratio) is named as Bola-Surfactant containing niosome.<sup>[5]</sup> The surfactants used in niosome preparation should be biodegradable, biocompatible and non-immunogenic. A dry product known as proniosomes may

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Review

## Drug delivery system based on chronobiology—A review

Asim Sattwa Mandal, Nikhil Biswas, Kazi Masud Karim, Arijit Guha, Sugata Chatterjee,  
Mamata Behera, Ketousetuo Kuotsu \*

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### ABSTRACT

With the advancement in the field of chronobiology, modern drug delivery approaches have been elevated to a new concept of chronopharmacology i.e. the ability to deliver the therapeutic agent to a patient in a staggered profile. However the major drawback in the development of such delivery system that matches the circadian rhythm requires the availability of precise technology (pulsatile drug delivery). The increasing research interest surrounding this delivery system has widened the areas of pharmaceutics in particular with many more sub-disciplines expected to coexist in the near future. This review on chronopharmaceutics gives a comprehensive emphasis on potential disease targets, revisits the existing technologies in hand and also addresses the theoretical approaches to emerging discipline such as genetic engineering and target based specific molecules. With the biological prospective approaches in delivering drugs it is well understood that safer and more realistic approaches in the therapy of diseases will be achieved in the days to come.

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### Contents

1. Introduction . . . . .	315
1.1. Diseases with established circadian rhythms . . . . .	316
1.1.1. Bronchial asthma . . . . .	316
1.1.2. Allergic rhinitis . . . . .	316
1.1.3. Pain . . . . .	316
1.1.4. Duodenal ulcer . . . . .	316
1.1.5. Cancer . . . . .	316
1.1.6. Cardiovascular diseases . . . . .	316
1.1.7. Diabetes . . . . .	317
1.1.8. Hypercholesterolemia . . . . .	317
1.1.9. Sleep disorder . . . . .	317
1.1.10. Epilepsy . . . . .	317
1.1.11. Alzheimer's disease . . . . .	317
1.1.12. Parkinson's disease . . . . .	317
1.1.13. Coagulation disorder and thrombosis . . . . .	317
1.1.14. Infectious diseases . . . . .	318
2. Various approaches of pulsatile drug delivery . . . . .	318
2.1. System based on osmosis . . . . .	318
2.2. System based on capsule . . . . .	318
2.3. System with erodible, soluble or rupturable membrane . . . . .	319
2.4. System with change in membrane permeability . . . . .	319
3. Various stimuli considered for release of drug . . . . .	320
3.1. pH . . . . .	320
3.2. Temperature . . . . .	320
3.3. Magnetic field . . . . .	320
3.4. Ultrasound . . . . .	320
3.5. Electric field . . . . .	321

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# Development of Oxytocin Nasal Gel using Natural Mucoadhesive Agent obtained from the Fruits of *Dellinia indica* L.

Ketousetuo Kuotsu and Amal Kumar Bandyopadhyay\*

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Received 16 Dec 2005

Accepted 27 Jul 2006

Tag-32

**ABSTRACT:** A new nasal gel formulation has been developed using a natural mucoadhesive agent obtained from the fruit of *Dellinia indica* L. The mucoadhesive strength and viscosity of this natural mucoadhesive agent was found to be higher in comparison to the synthetic polymers, namely hydroxy propyl methyl cellulose (HPMC) and carbopol 934, which are conventionally used for a similar purpose. *In vitro* drug release characteristics using a Franz-diffusion cell and excised bovine nasal membrane was also found to be better in comparison to the above synthetic polymers. This patient friendly, needle free dosage form may replace the oxytocin injections in the future.

**KEYWORDS:** Oxytocin; *dellinia indica* L., mucoadhesive, nasal drug delivery, carbopol 934, hydroxypropyl methyl cellulose.

## INTRODUCTION

Due to the advancement of biotechnology and genetic engineering, many new drugs are being developed which are small proteins or peptides. To deliver these drugs through non-parenteral routes is currently a challenging research area, since injection is one of the most hazardous routes of drug delivery. Administration of these drugs through nasal routes may be a very good alternative to injection.

Nasal transport can be studied in *in vitro* models using explanted nasal tissue such as porcine or bovine mucosa transferred to an "Ussing chamber", or cell culture models of nasal cells. *In-situ* perfusion of the nasal mucosa in rats or pharmacokinetic studies in animals has contributed much to the knowledge of nasal bioavailabilities, but studies elucidating transport mechanisms are difficult to perform<sup>1,3</sup>. *In vitro* permeability studies offer advantages over *in vivo* studies in that they can be performed more rapidly, involve fewer animals and simpler analytical procedures can be followed, since the presence of plasma proteins in the samples is avoided. Additionally, since pre- and post-mucosal factors are eliminated with *in vitro* techniques, the systems are more standardized<sup>4,5</sup>.

The aim of this study was to develop a nasal delivery system of oxytocin, which is used in the form of injections only, and to evaluate the drug release pattern in an *in vitro* system. The drug delivery system was developed using a natural mucoadhesive agent

extracted from *dellinia* fruits.

## MATERIALS AND METHODS

### Materials

Oxytocin powder was obtained as a gift sample from Hemmo Pharma, Mumbai. *Dellinia indica* fruits were purchased from local vendors. Hydroxy propyl methyl cellulose (HPMC) 5cPs and carbopol 934 were purchased from s. d. fine-chem. Ltd., Mumbai, India. HPLC solvents were purchased from Merck Ltd., Mumbai, India. All other reagents and chemicals used were of analytical grade.

### Methods

#### Extraction of Mucoadhesive Agents from the Fruits of *D. Indica* L.

*Dellinia* fruit mucilage was extracted following the methods of Rao et al.<sup>6,7</sup> with little modifications. 500 g of *dellinia* fruit was soaked in double distilled water and boiled under stirring condition in a water bath until a thick slurry was produced. This solution was cooled and kept in the refrigerator overnight so that the undissolved portion settles. The upper clear solution was decanted and centrifuged at 500 rpm for 20 min. The supernatant was separated, concentrated at 60 °C on a water bath until the volume was reduced to one fourth of its original volume, and cooled to room temperature. The concentrate was poured into thrice the volume of acetone with constant stirring. The



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Journal of Controlled Release 114 (2006) 15–40

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## Review

## Buccal bioadhesive drug delivery — A promising option for orally less efficient drugs

**Yajaman Sudhakar, Ketousetuo Kuotsu, A.K. Bandyopadhyay \****Buccal Adhesive Research Laboratory, Division of Pharmaceutics, Department of Pharmaceutical Technology, Jadavpur University, Kolkata 700032, India*

Received 4 December 2005; accepted 26 April 2006

Available online 7 July 2006

**Abstract**

Rapid developments in the field of molecular biology and gene technology resulted in generation of many macromolecular drugs including peptides, proteins, polysaccharides and nucleic acids in great number possessing superior pharmacological efficacy with site specificity and devoid of untoward and toxic effects. However, the main impediment for the oral delivery of these drugs as potential therapeutic agents is their extensive presystemic metabolism, instability in acidic environment resulting into inadequate and erratic oral absorption. Parenteral route of administration is the only established route that overcomes all these drawbacks associated with these orally less/inefficient drugs. But, these formulations are costly, have least patient compliance, require repeated administration, in addition to the other hazardous effects associated with this route. Over the last few decades' pharmaceutical scientists throughout the world are trying to explore transdermal and transmucosal routes as an alternative to injections. Among the various transmucosal sites available, mucosa of the buccal cavity was found to be the most convenient and easily accessible site for the delivery of therapeutic agents for both local and systemic delivery as retentive dosage forms, because it has expanse of smooth muscle which is relatively immobile, abundant vascularization, rapid recovery time after exposure to stress and the near absence of langerhans cells. Direct access to the systemic circulation through the internal jugular vein bypasses drugs from the hepatic first pass metabolism leading to high bioavailability. Further, these dosage forms are self-administrable, cheap and have superior patient compliance. Developing a dosage form with the optimum pharmacokinetics is a promising area for continued research as it is enormously important and intellectually challenging. With the right dosage form design, local environment of the mucosa can be controlled and manipulated in order to optimize the rate of drug dissolution and permeation. A rational approach to dosage form design requires a complete understanding of the physicochemical and biopharmaceutical properties of the drug and excipients. Advances in experimental and computational methodologies will be helpful in shortening the processing time from formulation design to clinical use. This paper aims to review the developments in the buccal adhesive drug delivery systems to provide basic principles to the young scientists, which will be useful to circumvent the difficulties associated with the formulation design.

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**Keywords:** Buccal delivery; Bioadhesive; Polymers; Formulation; Permeation enhancers; Evaluation**Contents**

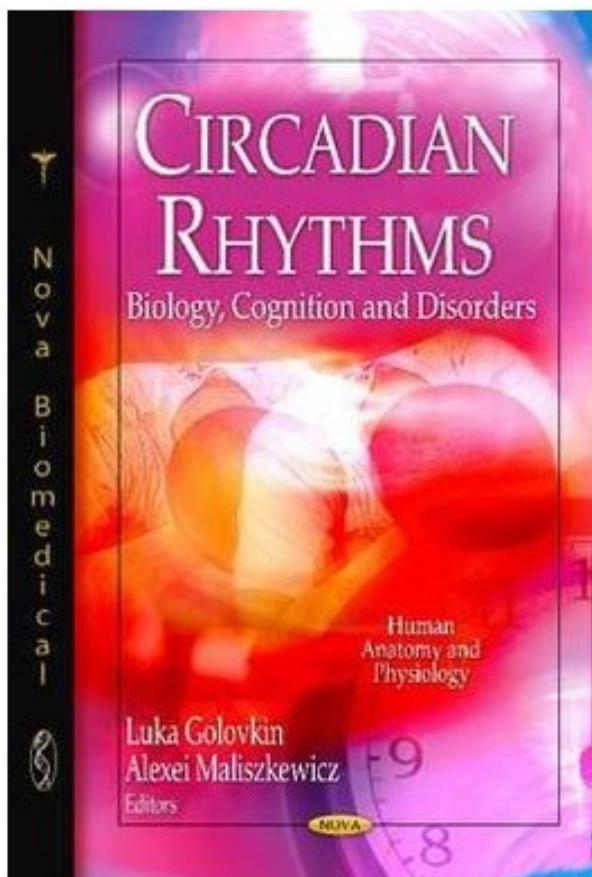
1. Introduction . . . . .	16
1.1. Buccal mucosal structure and its suitability . . . . .	17
1.2. Absorption pathways . . . . .	17
1.3. Barriers to penetration across buccal mucosa . . . . .	18
1.3.1. Membrane coating granules or cored granules . . . . .	18
1.3.2. Basement membrane . . . . .	18
1.3.3. Mucus . . . . .	18
1.3.4. Saliva . . . . .	19

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E-mail addresses: [yajaman\\_pharma@yahoo.com](mailto:yajaman_pharma@yahoo.com) (Y. Sudhakar), [akbju@yahoo.com](mailto:akbju@yahoo.com) (A.K. Bandyopadhyay).



Tag 34



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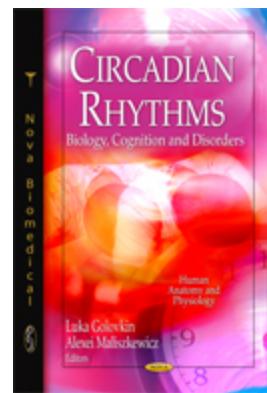
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**Chapter 1 - Circadian Clocks & Eating Disorders (pp. 1-27)**

**Authors / Editors:** (Johanna L. Barclay, Alexei Leliavski, Henrik Oster, Circadian Rhythms Group, Max Planck Institute for Biophysical Chemistry, Göttingen, Germany)

**Chapter 2 - Searching Membrane Target for Mammalian Circadian Clock Responsible for Circadian Modulation of Firing Rate (pp. 29-56)**

**Authors / Editors:** (Nikolai I. Kononenko, Department of General Physiology of Nervous System, Institute of Physiology, Kiev, Ukraine)

**Chapter 3 - Circadian and Ultradian Rhythms of Single Premature Beats in Older Healthy Men and Patients with Chronic Respiratory Insufficiency Processed by Inferential Statistics (pp. 57-83)**

**Authors / Editors:** (Stefan Kujanik Sr, Miroslav Mikulecky Sr., Department of Human Physiology, School of Medicine, University of P. J. Safarik, Kosice, Slovakia, and Department on Biometry and Statistics, Neuroendocrinology Letters, Stockholm-Bratislava, Slovakia and BioCos, University of Minnesota, Minneapolis, USA)

**Chapter 4 - Disruption of Circadian Rhythms in Hypersomnia, Insomnia, and Some Sleep Movement Disorders (pp. 85-107)**

**Authors / Editors:** (Pisko Juraj, Nevsimalova Sona, Department of Neurology, 1st Medical Faculty, Charles

Pasquale Montagna, Department of Neurological Sciences, University of Bologna, Italy)

**Chapter 14 - Circadian Variations: An Overview (pp. 327-346)**

**Authors / Editors:** (Ketousetuo Kuotsu, Arijit Guha, Asim Sattwa Mandal, Nikhil Biswas, Sugata Chatterjee, Mamata Behera, Subhasis Kundu, and Sreyashi Paul, Department of Pharmaceutical Technology, Jadavpur University, Kolkata, India)

**Chapter 15 - Bio-Clocks and Cardiovascular Talk: Blood Pressure Meets Nature (pp. 347-376)**

**Authors / Editors:** (Matilde E. Otero-Losada, Daniel R. Grana, Santiago Pérez Lloret, Francisco Azzato, José Milei, Instituto de Investigaciones Cardiológicas "Prof. Dr. Alberto C. Taquini" (ININCA), Universidad de Buenos Aires, Consejo Nacional de Investigaciones Científicas y Técnicas, Buenos Aires, Argentina)

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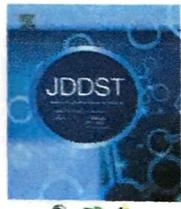
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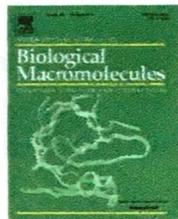


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Tag -38

No. 35/52/2010-BMS

Date 15/12/2011

X

The Registrar,  
Jadavpur University,  
Raja S C Mullick Road, Kolkata 700032

Subject:- Sanction of budget allotment for the new Research proposal entitled "Mesoporous silico nano particles for controlled release of insulin-design, fabrication and evaluation"

Sir/Madam,

The Director General of the Council sanctions the above mentioned research scheme initially for the period of one year from 1.1.2012 subject to extension up to the total duration specified in para 4 below:-

1. The Director General of the Council also sanctions the budget allotment of Rs 17,97,340/- as detailed in the attached statement for the period from 1.1.2012 to 31.12.2012. The grant-in-aid will be given subject to the following conditions.

2. The payment of the grant will be made in lump-sum to the Head of the institute. The first installment of the grant will be paid generally as soon as report regarding appointment of the staff is received by the Council. The Staff appointed on the project should be paid as indicated in the budget statement.

3. The staff on the project will be recruited as per the rules and procedure of the host institute and second part of the undertaking be obtained from the employees of the project. The staff grant will not be released unless the required undertaking [part-II] from Head of the Institute is received in this office.

4. The demand for payment of the subsequent installment of the grant should be placed with the Council in the prescribed proforma. The approved duration of the scheme is Three years. The annual extension will be given after review of the work done on the scheme during the previous year.

5. Fifteen copies of the annual progress report in the attached prescribed proforma should be submitted to the Council every year after completion of ten months of the project giving complete actual details of the research work done. Failure to submit the report in time may lead to termination of project.

The receipt of this letter may please be acknowledge.

Yours faithfully,

Admn Officer  
For Director General

Copy together with a copy of the budget statement forwarded to information to Dr. Ketousetuo Kuotsu, Lecturer, Deptt. Of Pharmaceutical Technology, Jadavpur University, Raja S C Mullick Road, Kolkata 700032

2. Accounts V for information
3. Budget forwarded to Budget Section [Finance Section] for compilation of the Council Budget
4. IRIS Cell No 2010-11820

Admn Officer  
For Director General

Tag - 38

BUDGET STATEMENT  
2011-2012

Subject:- Research project entitled "Mesoporous silico nano particles for controlled release of insulin-design, fabrication and evaluation" under Dr. Ketousetuo Kuotsu, Lecturer, Deptt. Of pharmaceutical Technology, Jadavpur University, Raja S C Mullick Road, Kolkata 700032

(1.1.2012 to 31.12.2012)

One SRF Rs. 18,000 p.m. + HRA 30% Rs. 5400 p.m.	Rs. 2,80,800
Contingency	Rs. 50,000
Equipment	Rs. 14,50,000
Surface area Analyzer (Gemini VII) -2390t Surface area analyzer	
Over head charges 5%	Rs. 16,540
Total	Rs. 17,97,340

**Total budget allotment of Rs. 17,97,340/- (Rupees seventeen lakh ninety seven thousand three hundred forty only)**

RFC No.BMS/Nano/46/11-12 dated 12.12.2011.

No. 35/52/2010-BMS



### AUDITOR'S REPORT

We report that out of Rs. 3,42,090.00 (Rupees Three lakh Forty Two thousand and Ninety only) of grant-in-aid received from the ICMR for the period 1<sup>st</sup> January 2014 to 31<sup>st</sup> December 2014 against sanction letter no. 35/62/2010-BMS dated 15/12/2011 and (-) Rs. 11,057 of deficit carried forward from previous year, a sum of Rs. 3,45,710.00 (Rupees Three lakh Forty Five thousand Seven hundred and Ten only) has been utilized during that period for the Research Project "MESOPORUS ..... EVALUATION", under Dr. Ketousetou Kuotsu, Jadavpur University and there was deficit of (-) Rs. 14,677.00 (deficit of Rupees Fourteen thousand Six hundred and Seventy Seven only) as on 31/12/2014. We further report that the grant has been utilized for the purpose for which it has been approved.

Place : Kolkata  
Date : 02/02/2016



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CSIR Complex, Library Avenue, Pusa, New Delhi 110 012  
Tele: 25842074 / 25841701 / 25842729 / 25842704  
<http://www.csirhrdg.res.in>

No 09/096(0677)/2011-EMR I

Subject: Extension of Senior Research Fellowship

Sir/Madam,

On the basis of satisfactory research progress of Mr. NIKHIL BISWAS as assessed and recommended by the three member assessment committee on completion of two/three years as SRF, the Head - Human Resource Development Group (CSIR) has been pleased to accord his approval to the extension of fellowship as SRF with effect from 01/04/2014 to 31/03/2015 with a stipend of Rs 20000/- per month.

The Senior Research Fellowship is subject to the existing terms & conditions governing CSIR fellowship which inter-alia provides that the total tenure of JRF and SRF combined is limited to five years.

Head, HRDG, CSIR has further been pleased to sanction the following additional grant towards the stipend and contingency for the period commencing from 01/04/2014 to 31/03/2015

Stipend: Rs 240000/- Contingency: Rs 20000/- Total: Rs 260000/-

The claim may be limited to the period of current financial year. For the period beyond that the claim may be submitted at the start of next financial year. No separate renewal sanction will be issued next year.  
The expenditure will be debited to the budget head grant in aid Fellowships P -81 101 for the current financial year.

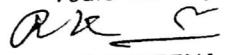
Tag-39

Date 11/6/2014

X

MEMORANDUM

✓ Meeting F.O  
✓ Research Project  
✓ Dr. R. KETOUSETUO KUOTSU  
✓ JRF Regd. No 0217814

Yours faithfully  
  
(R.K. MEENA  
SECTION OFFICE  
EMR  
16/6/2014)

To,  
DR. KETOSETUO KUOTSU  
PROJECT GUIDE  
DEPT. OF PHARMACEUTICAL TECHNOLOGY  
JADAVPUR UNIVERSITY  
KOLKATA, W.B.  
Pin 700032  
Copy to:

1. Mr. NIKHIL BISWAS, Through Project Guide
2. Registrar, JADAVPUR UNIVERSITY  
KOLKATA, W.B.  
Pin- 700032
3. F&AO (EMR)
4. Bill File
5. Office Copy

Council of Scientific & Industrial Research

Human Resource Development Group

(CSIR Complex, Opp. Institute of Hotel Management, Library Avenue, Pusa, New Delhi - 110 016)

ACK. No.: 111037/2K1041  
FILE NO.: 02/026(06 FTE)/2K-11-EMR-I

Dated: 28/05/2011

X

Tag - 39

NIKHIL BISWAS  
C/O - DR. KETOUSETUO KUOTSU,  
DEPARTMENT OF PHARMACEUTICAL  
TECHNOLOGY, JADAVPUR UNIVERSITY  
NA  
KOLKATA-700032

Award Letter

Sir/Madam,

With reference to your application and subsequent interview, I am happy to inform you that you have been selected for the award as per terms stated above. The award will be effective from the date mentioned above or from the date of joining research whichever is later. The duration of CSIR SRF and SRF (Extended) is as extended above.

The duration of the CSIR Research Associateship is one year and any further extension is at the discretion of CSIR, based on a three member Assessment Committee Report & Annual Progress Report. A copy of Terms & Conditions of CSIR Fellowship/ Associateship is available on HRDG website (<http://www.csirhrdg.res.in>). In case, the terms & conditions are acceptable to you, you may join the Fellowship/Associateship within the validity period and intimate to us.

The Director General, CSIR has also been pleased to sanction the Stipend and Contingency as stated above. In addition to Stipend & Contingency, House Rent Allowance & Medical Benefits will be payable as per rules of the host Institute limited to Central Govt. rates.

Please note that the validity of the award is for six months only from the effective date of award.

**The award of CSIR Fellowship / Associateship does not imply any assurance or guarantee to subsequent employment by CSIR.**

Yours faithfully,



SECTION OFFICER

Copy to :-

1 Registrar/Principal/Director, with the request to send the following documents to this office.

(A) Joining Report in the enclosed prescribed form.

(B) Undertaking in the enclosed prescribed form and consolidated bill claiming grants in respect of new awardees showing their names, fellowship letter number, date of joining and the amount admissible, in triplicate, as per enclosed bill form.

2. Sr. F&AO (EMR). The expenditure will be debit able to the Budget Head 'P-8I-101'.

3. Bill File.

4. Office Copy.

JADAVPUR UNIVERSITY  
KOLKATA – 700 032

Tag-39

BY SPEED POST

Ref. No.: R-10/B/92/13  
Dated : 12-4-13

The Deputy Secretary,  
Council of Scientific & Industrial Research,  
CSIR Complex,  
Opp. Institute of Hotel Management  
Library Avenue, PUSA,  
New Delhi – 110012.

X

Sub : SRFship to Nikhil Biswas,  
Deptt.of Pharmaceutical Technology,  
J.U Kolkata – 700 032  
under CSIR Direct Fellowship Scheme.

Dear Sir,

Ref : Annual Progress Report,  
for extension of SRF-ship.

Please refer to your letter No. 09/096(0677)/2011-EMR-I dt.28.03.2011. I am sending herewith the following paper in respect to above Research Fellow for your further necessary action:

- a) Progress Report for the period from 19.04.2011 to 04.04.2013.
- b) Recommendation of the three members assessment committee meeting held on 05.04.2013.

Yours faithfully,

  
REGISTRAR

Enclo :- As per text.

- Copy to:
- 1) Dr.Ketousetuo Kuotsu, Deptt. of Pharm.Tech.,JU.
  - 2) Research Section – 1 copy.
  - 3) Records – 2 copies.



MVD/Back up/CSIR - Format of forwarding letters

Technology Bhavan  
New Mehrauli Road  
New Delhi - 110 016



Tag-40

ORDER

Dated: 30<sup>th</sup> April, 2012

Subject: Financial Sanction of the research project titled "Design and evaluation of multiparticulate time programmed explosion system for pulsed release: An approach in the management of early morning surge in Blood Pressure" under the guidance of Dr. Ketousetuo Kuotsu, Deptt. of Pharmaceutical Technology, Jadavpur University, Jadavpur, Kolkata-700032, West Bengal - Release of first grant.

Sanction of Science and Engineering Research Board (SERB) is hereby accorded to the above mentioned project at a total cost of Rs. 19,55,000/- (Rupees Nineteen lakh fifty five thousand only) with break-up of Rs. 15,00,000/- under Capital head and Rs. 4,55,000/- under General head for a duration of three years. The items of expenditure for which the total allocation of Rs. 19,55,000/- has been approved for a period of three years, are given below:

Sl. No	Head	Total (in Rs.)
<b>A Non-recurring (Capital Items)</b>		
1	Equipment HPLC System, Pharma Coater	15,00,000
A'	<b>Total (Capital)</b>	<b>15,00,000</b>
<b>B Recurring Items (General)</b>		
1	General - A (Consumables, Travel, Contingencies, Analytical/Biological Analysis Charges)	1,55,000
2	General - B (Overhead Charges)	3,00,000
B'	<b>Total (General)</b>	<b>4,55,000</b>
C	<b>Total cost of the project (A' + B')</b>	<b>19,55,000</b>

2. Sanction of the SERB is also accorded to the payment of Rs. 15,00,000/- (Rupees Fifteen lakh only) under 'Grants for creation of Capital assets' and Rs. 1,50,000/- (Rupees One lakh fifty thousand only) under 'Grants-in-aid -General' to the Registrar, Jadavpur University, Jadavpur being the grant for the year 2012-13 for implementation of the said research project.

3. The expenditure involved is debitible to

**Grant-in-aid for the year 2012-13 (Plan Expenditure- Capital) - Rs. 15,00,000/-**

&

**Grant-in-aid for the year 2012-13 (Plan Expenditure- General) - Rs. 1,50,000/-**

This release is made under OYS Scheme.

4. The Sanction has been issued with the approval of the competent authority under delegated powers and vide Diary No.SERB/F/ 339 /2012-13 dated 23<sup>rd</sup> April, 2012 .

Contd...2/-

Tag - 40

5 Sanction of the grant is subject to the conditions as detailed in Annexure - I.

6. Overhead expenses are meant for the host Institute towards the cost for providing infrastructural facilities and general administrative support etc. including benefits to the staff employed in the project.

7. While providing operational flexibility among various subheads under head General-A, it should be ensured that not more than Rs. 1.5 lakh each should be spent for travel and contingency.

8. The total release amount of **Rs. 16, 50,000/- (Rupees Sixteen lakh fifty thousand only)** will be drawn by the Drawing & Disbursing Officer of the SERB and will be disbursed by means of cheque/DD favoring "**REGISTRAR, JADAVPUR UNIVERSITY, KOLKATA**" and will be sent to **Registrar, Jadavpur University, Jadavpur, Kolkata-700032, West Bengal.**

9. As per rule 211 of GFR, the accounts of project shall be open to inspection by sanctioning authority/audit whenever the institute is called upon to do so.

10. The institute will furnish to the SERB, New Delhi, Utilization certificate and an audited statement of accounts pertaining to the grant immediately after the end of each financial year.

11. The manpower sanctioned in the project, if any is co-terminus with the duration of the project and SERB will have no liability to meet the fellowship etc. beyond the duration of the project.

12. The institute will maintain separate audited accounts for the project. It is found expedient to keep a part or whole of grant in a separate bank account earning interest. The interest earned should be reported to the SERB, New Delhi. The interest thus earned will be treated as a credit to the institute to be adjusted towards further installment of the grant.

13. The sanctioned equipments would be procured as per GFR and its disposal would be done with prior approval of SERB.

14. The project File no. **SR/FT/LS-21/2011** may also be mentioned in all research communications arising from the above project with due acknowledgement of SERB.

15. As this is the first grant being released for the project, no previous U/C is required.

(Jacob VV)  
Scientist-D

**Copy forwarded for information and necessary action to: -**

1	The Principal Director of Audit, A.G.C.R. Building, IIIrd Floor I.P. Estate, Delhi-110002
2	Copy with two spare copies of the sanction to the Drawing and Disbursing Officer, SERB, New Delhi
3	Pay Accounts Officer, SERB, New Delhi
4	Sanction Folder, SERB, New Delhi.
5	File Copy
6	Dr. Ketousetuo Kuotsu, Dept. of Pharmaceutical tech., Jadavpur University, Jadavpur, Kolkata-700032, West Bengal
7	The Registrar, Jadavpur University, Jadavpur, Kolkata-700032, West Bengal

(Jacob VV)  
Scientist-D



Tag-40

### UTILISATION CERTIFICATE

Certified that out of Rs. Nil of grant-in-aid sanctioned during the year 2015-2016 in favour of Jadavpur University, Kolkata - 700032 under this Ministry/Department letter no. SR/FT/LS-21/2011 dated N.A., of (-) Rs. 1,46,956.00 (deficit of Rupees One lakh Forty Six thousand Nine hundred and Fifty Six only) on a/c of deficit carried forward from the previous year, a sum of Rs. 39,297.00 (Rupees Thirty Nine thousand Two hundred and Ninety Seven only) has been utilized during the year 2015-2016 for the purpose of the DST sponsored scheme entitled "*DESIGN AND EVALUATION ..... IN BLOOD PRESSURE*", Dr. *Ketousetuo Kuotsu, Jadavpur University*, for which it was sanctioned and that there was a deficit of (-) Rs. 1,86,253.00 (deficit of Rupees One lakh Eighty Six thousand Two hundred and Fifty Three only) at the end of the project period.

Place : Kolkata

Date : 14/10/2015

  
Chartered Accountant

D. Bandyopadhyay, Proprietor  
M. No.- 05786:  
for DEBASIS BANDYOPADHYAY  
Chartered Accountant



ज्ञान-विज्ञान विमुक्तये

TG-41

Annexure - VIII

UNIVERSITY GRANTS COMMISSION  
BAHADUR SHAH ZAFAR MARG  
NEW DELHI - 110 002.

ACCEPTANCE CERTIFICATE FOR RESEARCH PROJECT

Name Dr. Ketousetuo Kuotsu

No.F. 41-718/2012 (SR)

dated 23/07/2012

Title of the Project "Development, characterization and evaluation of valacyclovir-loaded nanoparticles"

1. The research project is not being supported by any other funding agency.
2. The terms and conditions related to the grant are acceptable to the Principal Investigator and University/College/Institution.
3. At present, I have no research project approved by UGC and the accounts for the previous project, if any have been settled.
4. The College/University is fit to receive financial assistance from UGC and is included in the list prepared by the UGC.
5. The Principal Investigator is a retired teacher and eligible to receive honorarium as he/she is neither getting any honorarium from any agency nor is he/she gainfully employed anywhere.
6. His/her date of birth is 19/06/1979
7. The date of implementation of the project is 01/07/2012

Principal Investigator

Dated: 06/08/2012

Registrar/Principal  
University/College

R. S. J. N. L.  
REGISTRAR  
JADAVPUR UNIVERSITY

Dr. Ketousetuo Kuotsu,  
M.Pharm., Ph.D.  
Assistant Professor  
Department of Pharmaceutical Technology,  
Jadavpur University, Kolkata - 700 032



UGC SUPPORT FOR MAJOR RESEARCH PROJECTS  
UGC SUPPORT FOR MAJOR RESEARCH PROJECTS  
UGC SUPPORT FOR MAJOR RESEARCH PROJECTS



OPENING OF THE NEW  
UNIVERSITY GRANTS COMMISSION  
HEADQUARTERS  
NEW DELHI-110 002

10-01-2012 (SR)

The Under Secretary (FD III)  
University Grants Commission  
New Delhi-110002

UGC support for the Major Research Project in Physical Sciences, Bio Sciences, Maths, Medical, Agricultural Sciences and Engineering & Chemistry to University/College Teachers - Project entitled  
"Development, characterization and evaluation of valacyclovir-loaded nanoparticles"

Tag-41

23 JUL 2012

I am to refer to your letter forwarding the application of Dr. Ketousen Kuotsu of your institution for financial assistance under the above scheme and to convey the Commission's approval & sanction amount of Rs. 6,39,000/- (Rupees: six lakh thirty nine thousand only) to the Registrar, Jadavpur University, Kolkata 700032 WB in re Major Research Project of Dr. Ketousen Kuotsu, Department of Pharmacy for the period of 3 years w.e.f 1.7.2012 as detailed below:-

SlNo	ITEMS	AMOUNT APPROVED	GRANT RELEASED AS 1st INSTALMENT	Category
A.	<b>Non - Recurring</b>		6,00,000/-	ST
1.	Books & Journals	nil		
2.	Equipment (Programmable tablet dissolution app.)	6,00,000/-		
B.	<b>Recurring</b>		39,000/-	
1.	Honorarium to Resd. Teacher @ Rs. 12,000/- p.m.	nil		
2.	Project Fellow @ 14,000/- p.m. for initial 2 years and Rs. 16,000/- p.m. from the third year onwards	nil		
3.	Chemical Glassware Consumable	1,000/-		
4.	Hiring Services	nil		
5.	Contingency	50,000/-		
6.	Travel/Field Work	nil		
7.	Special Need	nil		
8.	Overhead Charges @ Rs. 10% approved recurring Grant (Except Travel & Field Work)	6,500/-		
	Total (A + B)	6,71,500/-	6,39,000/-	

The acceptanc e Certificate or prescribed format (Annexure I available on the UGC web site) may be sent to undersigned within one month from the issue of the award letter failing which the project may be treated as cancelled.

If the terms & conditions are acceptable, as per guideline which are available on UGC web site, the Demand Draft/ Cheque being sent may be retained. Otherwise the same may be returned in original to UGC by Registered Post in writing within 15 days from the receipt of the Demand Draft/Cheque to the Secretary UGC, New Delhi.

Principal investigator should ensure that the statement of expenditure & Utilisation Certificate to the effect that amount has been utilized for the purpose for which grant sanctioned will be furnished to the Secretary UGC at earliest time.

The first instalment of the grant shall comprise of 100% of the Non - Recurring (including Over Head Charges, and 50% of the total Recurring grant.

*Tag-41*

## UTILIZATION CERTIFICATE

Certified that Rs. 6,65,896.00 (Rupees Six lakh Sixty Five thousand Eight hundred and Ninety Six only) has been utilized in respect of the Research Project entitled "**DEVELOPMENT ..... LOADED NANOPARTICLES**" under Dr. Ketousetuo Kuotsu, Dept. of Pharmaceutical Technology, Jadavpur University, Kolkata – 700032, approved by the UGC vide letter No. F.41-718/2012(SR) dt 23/07/2012 and in accordance with the terms and conditions laid down by the University Grants Commission, against the grant of Rs. 6,65,000.00 (Rupees Six lakh and Sixty Five thousand only) received from the UGC and thus there was deficit of (-) Rs. 896.00 (deficit of Rupees Eight hundred and Ninety Six only) at the termination of the scheme.

.....  
  
PRINCIPAL INVESTIGATOR

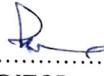
Dr. Ketousetuo Kuotsu,  
M.Pharm, Ph.D.  
Assistant Professor

Department of Pharmaceutical Technology  
Jadavpur University, Kolkata - 700 032

.....  
  
P. I. Ghosh  
REGISTRAR  
Registrar  
JADAVPUR UNIVERSITY

.....  
  
FINANCE OFFICER

Finance Officer  
JADAVPUR UNIVERSITY

.....  
  
AUDITOR

D. Bandyopadhyay, Proprietor  
M. No.- 057861  
for DEBASIS BANDYOPADHYAY & CO.  
Chartered Accountants



S.M. Suresh  
Director (RID)

आखेल भारतीय तकनाका शक्षा पारषद्  
ALL INDIA COUNCIL FOR TECHNICAL EDUCATION  
(भारत सरकार का एक सांविधिक निकाय) (A STATUTORY BODY OF THE GOVT. OF INDIA)

F. No.: I-10/RID/NDF-35/2009-10  
Dated: February 26, 2010

OFFER LETTER

X

Tag - 42

To,

THE REGISTRAR,  
Jadavpur University,  
Kolkata

Sub: Offer of AICTE National Doctoral Fellowship during the Financial Year 2009-10  
- reg.

Sir/Madam,

With reference to the application and subsequent interview of ASIM SATTWA MANDAL Research Scholar in the Discipline of Pharmacy of your institute for the award of AICTE National Doctoral Fellowship during the financial year 2009-10, the All India Council for Technical Education has decided to offer the said fellowship to the candidate through your institutes as per the details given below:

Fellowship	:	Rs. 18,000/- per month per candidate
Contingency Allowance	:	Rs. 25,000/- per annum per candidate
Institutional Overhead Charges	:	Rs. 20,000/- per annum per candidate to the host institution

The National Doctoral Fellowship is offered for a period of three years or till the completion of research, whichever is earlier.

The award of fellowship will be subjected to the following terms and conditions:-

- Verification of eligibility conditions as mentioned in the information brochure or the AICTE website [www.aicte.ernet.in](http://www.aicte.ernet.in).
- Satisfactory annual monitoring report / feedback proforma by the guide countersigned by the head of the institute to be submitted every year in the enclosed proforma.
- Submission of enclosed undertaking by the candidate, guide and the head of the institute.

Contd.../-

Tag-42

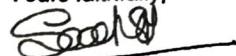
F. No.: I-10/RID/NDF-35/2009-10

The fellowship will be released to the institute as and when the Council receives the above-mentioned undertaking.

If in the event of the candidate having been found ineligible at any stage in future for the award due to any reason, the award may be withdrawn by the AICTE at any time.

Thanking you,

Yours faithfully,



(S.M. Suresh)  
Director (RID)

**Copy to:**

**ASIM SATTWA MANDAL (RESEARCH SCHOLAR)**  
C/o Dr. Ketousetuo Kuotsu,  
Department of Pharmaceutical Technology,  
Jadavpur University, Kolkata,  
West Bengal-700032

Note: These forms are available on the AICTE website [www.aicte.emet.in](http://www.aicte.emet.in)

- (i) Undertaking by the candidate
- (ii) Undertaking by the institute
- (iii) Monitoring Proforma.

JALAVPUR UNIVERSITY  
KOLKATA-700 032

SPEED POST

Tag-42

Ref. No.: C.S/AICTE/13  
Dated : 22/1/13

X

The Advisor (RIFD),  
All India Council for Technical Education,  
5th Floor, East Tower,  
NBCC Place, Bhisham Pitahma Marg,  
Pragati Vihar, Lodhi Road,  
New Delhi-110 003.

Sub.: Submission of Refund of DD of Rs. 2,08,879/-, in respect of Sri. Asim Sattwa  
Mandal, National Doctoral Fellow, Dept. of Pharm. Tech., JU.

File No.: 1-10/RID/NDF-35/2009-10.

Date of Joining of the Fellow: 01.10.2010.

Dear Sir,

The undersigned is pleased to forward herewith the following documents for your kind perusal and acceptance.

- (i) Refund of Unspent balance by Demand Draft No.003241 dated 22.01.2013 of Rs. 2,08,879 in favour of Member Secretary, AICTE payable at New Delhi.
- (ii) Copy of University letter Ref. No. G-5/AICTE/33/12 dt. 03.12.2012.
- (iii) Audited Statement of Accounts & Utilization Certificate during the period 01.10.2012 to 18.11.2012.
- (iv) Copy of Resignation Letter w.e.f. 18.11.2012 (A.N)
- (v) Monitoring Proforma during the period from 01.10.2012 to 18.11.2012.

In this connection, it may be noted that the University has already been sent the resignation letter, Progress report (01.10.2012 to 18.11.2012) and monitoring proforma to you vide our University letter Ref. No. G-5/AICTE/33/12 dt. 03.12.2012.

This is submitted for your kind acceptance and closure of the accounts in respect of the above mentioned Project.

Thanking you,

Yours faithfully,

*B. S. Ray (111)*  
REGISTRAR

Enclo.: (i), (ii), (iii), (iv) & (v).

Copy to: Research Sce-1 copy.  
Records-2 copies.  
Dr. Ketousetuo Kuotsu, Dept. of Pharm. Tech, JU.

S. Bhattacharya/Sb(D/AICTE/Aictc Again.)

22/1/13  
22/1/13

Tag-42

### UTILISATION CERTIFICATE

Certified that out of Rs. 2,60,983/- (Rupees Two lakh Sixty thousand Nine hundred and Eighty Three only) of the Fellowship Grant sanctioned by the All India Council for Technical Education (AICTE), New Delhi – 110002 vide their Sanction Letter F.No. I-10/RID/NDF-35/2009-2010 dated 30/11/2012 and Rs. 17/- (Rupees Seventeen only) on a/c of unspent balance carried over from previous year Rs. 52,121/- (Rupees Fifty Two thousand One hundred and Twenty One only) has been utilized by Sri Asim Sattwa of Jadavpur University, Kolkata – 700032, for NATIONAL DOCTORAL FELLOWSHIP during the period 1<sup>st</sup> October, 2012 to 18<sup>th</sup> November, 2012 and a balance of Rs. 2,08,879/- (Rupees Two lakh Eight thousand Eight hundred and Seventy Nine only) remain unspent at the end of the period, as per details given in the attached statement and subject to the following comments:

1. The Statement of Accounts has been audited on the basis of books of accounts and vouchers made available and explanations furnished to us.
2. The expenditures have been incurred as per financial terms and conditions, laid down by the AICTE, as appears from the records produced before us.

Place : Kolkata  
Date : 16/01/2013



Debasis Bandyopadhyay, Proprietor,  
(M. No. - 057861)  
For DEBASIS BANDYOPADHYAY & CO.  
Chartered Accountants

Tag - 43

যাদবপুর বিশ্ববিদ্যালয়  
কলকাতা-৭০০০৩৬, ভারত



\*JADAVPUR UNIVERSITY  
KOLKATA-700 032, INDIA

Ref. No.: R-11/724/19  
Date: 26.6.19

### Departmental Support towards Upgradation in Research

Name of the Coordinator(s) with Institute: Prof. (Dr.) Ketousetuo Kuotsu, Director, Clinical Research Centre (CRC)

Research Thrust Area: Research in Sustainable Development

Title of the Project: Design, Development and Characterization of Colon Targeted Oral Anticancer Drug Delivery System, Modulation with Poly-L-lysine.

General Guidelines must be followed by the Coordinator(s):

1. The selection of Project Assistant shall be made as per State Govt. Norms
2. All purchase be made FD Memo No: 5400-F(Y) dt. 25.06.2012 and subsequent memos.
3. TA /DA will be paid as per UGC rule.
4. Follow the Budget break-up given below

<u>Item of expenditure</u>	<u>Budget</u>
<b>Manpower / Hiring Services</b> (3 Project Assistants @ Rs. 20,800/- pm)	Rs. 7,48,800/-
<b>Repair of Existing Equipment; Maintenance</b> <b>Contract of Existing Equipment</b> [1. Epi-LED – Reflected LED Fluorescence attachment, free from any alignments and ready to attach 2. Kinetica Software – Pharmacokinetics/pharmacodynamic (PK/PD)]	Rs. 6,58,729/- [Rs. 1,33,729/- Rs. 5,25,000/-]
<b>Consumables</b>	Rs. 3,66,584/-
<b>Travel</b>	Rs. 50,000/-
<b>Contingency</b>	Rs. 1,50,000/-
<b>Grand Total</b>	Rs. 19,74,113/-

5. Duration: Up to March 2020, however for smooth utilization of spending must be completed within 15<sup>th</sup> March, 2020.
6. Disbursement of other processing formalities will be booked by RUSA 2.0 Cell as per existing rules/ processes.
7. Detailed guidelines of spending has already been notified in JU Website.

Signature  
24.06.19

Registrar  
Jadavpur University

\* Established on and from 24<sup>th</sup> December, 1955 vide Notification No.19984-Edu/ILU-42/55 dated 6<sup>th</sup> December, 1955 under Jadavpur University Act, 1955 (West Bengal Act XXIII of 1955) followed by Jadavpur University Act, 1981 (West Bengal Act XXIV of 1981).

Serial No.	Name	Project Title	Year of degree awarded
1	Kazi Masud Karim	A rapid pharmacological pulsatile delivery of captopril capsules for the treatment of acute disorders.	2010 X
2	Mamata Behera	Development and characterization of microsphere delivery system containing anti-hypertensive agent using Propranolol Hydrochloride as model drug.	2011 X
3	Sugata Chatterjee	Design, development and comparative evaluation of microspheres prepared with natural synthetic polymers using Valacyclovir Hydrochloride as the model drug.	2011 X
4	Subhasis Kundu	Multiparticulate retentive drug delivery of Amoxicin Trihydrate - an <i>in vitro</i> evaluation.	2012 X
5	Sreyashi Paul	Design, development, characterization and evaluation of Valacyclovir Hydrochloride loaded gelatin nanoparticles.	2012 X
6	Sanjit Kr. Roy	Formulation and evaluation of sustained release bilayer tablets of Losartan Potassium.	2013 X
7	Sweet Naskar	Design, development and fabrication of Galantamine Hydrobromide transdermal patches - an <i>in vitro</i> evaluation.	2013 X
8	Mohulima Kumar	Design, development and evaluation of Valsartan multiparticulate explosion system for management of early morning surge in blood pressure.	2014 X
9	Shinjita Ghosh	Prospective observational study of the pattern of usage of oral contraceptive pills.	2014 X
10	Bidyut Tantra	Prospective observational study on Vitamin D level in children with aches and pains and response to treatment.	2014 X
11	Moumita Kundu	Design, development and evaluation of pulsatile drug delivery system for Paclitaxel based on thermoresponsive polymer.	2015 X
12	Md. Sharique	Design and development of Amikacin nanoparticles and its <i>in vitro</i> activity against preformed biofilms.	2016 X
13	Debarati Ghosh	Development, characterization and evaluation of Capecitabine loaded Chitosan tripolyphosphate nanoparticles.	2016 X
14	Susmita Das	Design, fabrication and <i>in vitro</i> evaluation of Paclitaxel loaded nanostructured lipid carriers	2017
15	Jayeta Basak	Efficacy of empiric dual antibiotic therapy in treatment of gram negative bacterial infection.	2017
16	Priyam Pandit	Novel fabrication of Venlafaxine Hydrochloride floating tablet.	2018
17	Pratik Chakraborty	Design and formulation of a three pulse release solid oral dosage form of Amoxicillin Trihydrate.	2018
18	Rubina Zaman	Pattern of medication usage for migraine headache.	2018
19	Arunaksha Chakraborty	Fabrication and <i>in vitro</i> evaluation of Glimipiride Metformin matrix pulsatile tablet- an approach in the management of Diabetes mellitus	2019
20	Anjali Mondal	Design, development and <i>in vitro</i> evaluation of Prazosin floating doughnut shaped tablets.	2019
21	Jaita Sarkar	Development and <i>in-vitro</i> evaluation of osmotically	2020

		controlled oral drug delivery system of prazosin HCl	
22	Arnab Kumar Singhadeo	Fabrication and <i>in-vitro</i> release study of chronomodulated pulsatile metoprolol succinate tablets- an approach towards hypertension	2020

**Tag 45**

**Ph.D. Degree Awarded**

<b>Serial No.</b>	<b>Name</b>	<b>Project Title</b>	<b>Year of degree awarded</b>
1	Asim Sattwa Mondal	Design, development and evaluation of oral novel mucoadhesive donut shaped Captopril tablets	2012 X
2	Bhartikar Yogesh Pandharinath	Studies on the bioactive constituents of <i>Azadirachta indica</i> and <i>Shorea robusta</i>	2014 X
3	Ranjan Kumar Sahoo	Design, development and evaluation of Maltodextrin based Proniosomal drug delivery system containing antidiabetic drug Nateglinide.	2015 X
4	Nikhil Biswas	Programmed polymeric device for pulsed delivery: an approach in the management of hypertension using hypertensive as a model drug.	2016 X
5	Arijit Guha	Mesoporous silica nanoparticles for controlled delivery of Insulin: design, fabrication and evaluation.	2016 X
6	Nityananda Sahoo	Design, development and evaluation of Valacyclovir Hydrochloride loaded nanoparticles.	2016 X
7	Radharani Panda	A smart approach in the delivery of anticancer drugs in nanostructured lipid carriers composites- assessment and its evaluation.	2020 ✓

Tag - 45/a

# ঝাড়বপুর বিশ্ববিদ্যালয়

**DR. B. KARMAKAR**  
**PRINCIPAL SECRETARY**  
**FACULTY OF ENGINEERING & TECHNOLOGY**



\*JADAVPUR UNIVERSITY  
KOLKATA-700 032, INDIA

Ref. No. S-21/260/2020

Date: February 28, 2020  
3.3

**Dr. Ketousetuo Koutsu,**  
**Department of Pharmaceutical Technology,**  
**Jadavpur University,**  
**Kolkata – 700 032**

Sir/Madam,

With reference to the thesis entitled "**A Smart Approach in the Delivery of Anti-Cancer Drugs in Nanostructured Lipid Carriers Composites – Assessment and its Evaluation**" submitted by **Smt. Radharani Panda** for Ph.D. (Engg./Pharm.) degree of this University. You are requesting to be present and evaluate the Viva Voce Examination of **Radharani Panda**. The viva-voce examination will be held on **20<sup>th</sup> March, 2020 at 01.30 P.M.** in the **Seminar Room of Department of Pharmaceutical Technology, Jadavpur University**.

The University will be pleased to pay you a sitting allowance of **Rs.1000/-** as a sitting allowance for conducting the viva voce examination.

Yours faithfully

(Dr. B. Karmakar)  
Principal Secretary

**Copy to:** Secretary, FET (File No. 237/15/PH)  
Records – 2

Sn

\* Established on and from 24<sup>th</sup> December, 1955 vide Notification No.10986-Edn/IU-42/55 dated 6<sup>th</sup> December, 1955 under Jadavpur University Act, 1955 (West Bengal Act XXXIII of 1955) followed by Jadavpur University Act, 1981 (West Bengal Act XXIV of 1981)

যাদবপুর বিশ্ববিদ্যালয়

Tag - 45/6



DR. B.KARMAKAR  
PRINCIPAL SECRETARY  
FACULTY OF ENGINEERING & TECHNOLOGY

\*JADAVPUR UNIVERSITY  
KOLKATA-700 032, INDIA

Ref. No. S-21/1609/16

X

Date: September 15, 2016

19

To  
**Dr. Ketousetuo Kuotsu**  
Assistant Professor  
Department of Pharmaceutical Technology  
Jadavpur University  
Kolkata-700032

Sir/Madam,

With reference to the thesis entitled "Development, Characterization and Evaluation of Valacyclovir Loaded Nanoparticles" by **Shri Nityananda Sahoo** for Ph.D (Engg.) degree of this University. You are requesting to be present and evaluate the Viva Voce Examination of **Shri Nityananda Sahoo**. The viva-voce examination will be held on 23<sup>rd</sup> September (Friday) 2016 at 12:00 Noon in the Seminar Hall, Department of Pharmaceutical Technology, Jadavpur University.

The University will be pleased to pay you a sitting allowance of Rs.1000/- as a sitting allowance for conducting the viva voce examination.

Yours faithfully

(Dr. B. Karmakar)  
Principal Secretary

**Copy to:** Secretary, FET (File No. 182/13/P)  
Records – 2

[AG]

Established on and from 24<sup>th</sup> December, 1955 vide Notification No.10986-Edu/IU-42/55 dated 6<sup>th</sup> December, 1955 under Jadavpur University Act, 1955 (West Bengal Act XXIII of 1955) followed by Jadavpur University Act, 1981 (West Bengal Act XXIV of 1981)

নথি নং: ২৪১৪-৬০০৮/৫৫৬৬, প্রদত্ত নং: ২২১৭/২৮৮০

Website: [www.jadavpur.edu](http://www.jadavpur.edu) Phone : 91-33-2414-6008/6666, Ext. : 2215/2440  
E-mail: [secretary\\_fet@admin.jdvu.ac.in](mailto:secretary_fet@admin.jdvu.ac.in) Fax: 91-33-2414-6007

নথি নং: +৯১-৩৩-২৪১৪-৬০০৭

Tag -45/C

যাদবপুর বিশ্ববিদ্যালয়



DR. B.KARMAKAR  
PRINCIPAL SECRETARY  
FACULTY OF ENGINEERING & TECHNOLOGY

\*JADAVPUR UNIVERSITY  
KOLKATA-700 032, INDIA

Ref. No. S-21/1565/16

X

Date: September 7, 2016

08

To  
**Dr. Ketousetuo Kuotsu**  
Assistant Professor  
Department of Pharmaceutical Technology  
Jadavpur University  
Kolkata - 700032

Sir/Madam,

With reference to the thesis entitled "Mesoporous Silica Nanoparticles for Controlled Delivery of Therapeutic Cargo-Design, Fabrication and Evaluation" by Shri Arijit Guha for Ph.D (Engg.) degree of this University. You are requesting to be present and evaluate the Viva Voce Examination of Shri Arijit Guha. The viva-voce examination will be held on 14<sup>th</sup> September (Wednesday) 2016 at 12:00 Noon in the Seminar Hall, Department of Pharmaceutical Technology, Jadavpur University.

The University will be pleased to pay you a sitting allowance of Rs.1000/- as a sitting allowance for conducting the viva voce examination.

Yours faithfully

(Dr. B. Karmakar)  
Principal Secretary

**Copy to:** Secretary, FET (File No. 76/10/Ph)  
Records – 2

[AG]

H<sup>w</sup>

Established on and from 24<sup>th</sup> December, 1955 vide Notification No.10986-Edu.IU-42/55 dated 5<sup>th</sup> December, 1955 under Jadavpur University Act, 1955 (West Bengal Act XXIII of 1955) followed by Jadavpur University Act, 1981 (West Bengal Act XXIV of 1981)

মুদ্রায়: ১৪১৮-৮০৮/৮৬৬৬, প্রসারণ ১১১৫/১৮৮০

নথিনং: +৯১-৩৩-২৪১৪-৮০১৭

Website:www.jadavpur.edu

Phone : 91-33-2414-6008/6666, Ext. : 2215/2440

E-mail:secretary\_fet@admin.jdvu.ac.in

Fax:91-33-2414-6007

Tag-45/d

## যাদবপুর বিশ্ববিদ্যালয়

DR. B.KARMAKAR  
PRINCIPAL SECRETARY  
FACULTY OF ENGINEERING & TECHNOLOGY



\*JADAVPUR UNIVERSITY  
KOLKATA-700 032, INDIA

X

Ref. No. S-21/1517/16

Date: 29 August, 2016

30

To,  
Dr. Ketousetuo Kuotsu  
Assistant Professor  
Department of Pharmaceutical Technology  
Jadavpur University  
Kolkata - 700 032

Sir / Madam.

With reference to the thesis entitled "**Programmed Polymeric Device for Pulsed Delivery: An Approach in the Management of Hypertension Using Antihypertensive Agent as Model Drug**" submitted by Sri Nikhil Biswas for Ph.D (Engg.) degree of this University. You are requesting to be present and evaluate the viva-voce examination of Sri Nikhil Biswas. The viva-voce examination will be held on on **9th September (Friday) 2016 at 12:00 Noon** in the **Seminar Hall of the Department of Pharmaceutical Technology** of Jadavpur University.

The University will be pleased to pay you a token honorarium of **Rs.1000/-** as a sitting allowance for conducting the viva voce examination

Yours faithfully

(Dr. B. Karmakar)  
Principal Secretary

**Copy to:** Secretary, FET (File No. 83/10/Ph.)

Records - 2

Established on and from 24<sup>th</sup> December, 1955 vide Notification No.10986-Edu/IU-42/55 dated 6<sup>th</sup> December, 1955 under Jadavpur University Act, 1955 (West Bengal Act XXIII of 1955) followed by Jadavpur University Act, 1981 (West Bengal Act XXIV of 1981)

নথিনং: ১৪১৪-২৫০৮/১৫৪৪, প্রদর্শন: ১২১৭/১৫৮০

Website: [www.jadavpur.edu](http://www.jadavpur.edu)

Phone : 91-33-2414-6008/6066, Ext. : 2215/2440

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E-mail:[secretary\\_fet@admin.jdvu.ac.in](mailto:secretary_fet@admin.jdvu.ac.in)

Fax: 91-33-2414-6007

যাদবপুর বিশ্ববিদ্যালয়

DR. B.KARMAKAR  
PRINCIPAL SECRETARY  
FACULTY OF ENGINEERING & TECHNOLOGY



\*JADAVPUR UNIVERSITY  
KOLKATA-700 032, INDIA

Tag-45/e

X

Ref. No. S-21/715/15

Date: June 24, 2015

25

To,  
Dr. Ketousetuo Kuotsu,  
Department of Pharmaceutical Technology,  
Jadavpur University,  
Kolkata - 700 032

Sir/Madam,

With reference to the thesis entitled "Design, Development and Evaluation of Maltodextrin Based Proniosomal Drug Delivery System Containing Anti-Diabetic Drug, Nateglinide" submitted by Sri Ranjan Kumar Sahoo for Ph.D. (Engg./Pharm.) degree of this University. You are requesting to be present and evaluate the viva-voce examination of Sri Ranjan Kumar Sahoo. The viva-voce examination will be held on 10<sup>th</sup> July (Friday) 2015 at 1.00 p.m. in the Seminar Hall of the Department of Pharmaceutical Technology of Jadavpur University.

The University will be pleased to pay you a token honorarium of Rs.1000/- as a sitting allowance for conducting the viva voce examination.

Yours faithfully,

( Dr. B. Karmakar)  
Principal Secretary, F.E.T.

**Copy to :** Secretary, FET (File No. 134/12/Ph.)  
Records - 2  
Accounts Cell - 1

Sm.

H.M.

\* Established on and from 24<sup>th</sup> December, 1955 vide Notification No.10986-Edn/IU-42/55 dated 6<sup>th</sup> December, 1955 under Jadavpur University Act, 1955 (West Bengal Act XXXIII of 1955) followed by Jadavpur University Act, 1981 (West Bengal Act XXIV of 1981)

যাদবপুর বিশ্ববিদ্যালয়

Tag-45/f

DR. B.KARMAKAR  
PRINCIPAL SECRETARY  
FACULTY OF ENGINEERING & TECHNOLOGY



\*JADAVPUR UNIVERSITY  
KOLKATA-700 032, INDIA

X

Ref. No. S - 21/840/14.

Date: June 3, 2014

স,

To,  
Dr. Ketouseto Kuotsu,  
Pharmaceutical Technology Department,  
Jadavpur University,  
Kolkata - 700 032

Sir/Madam.

With reference to the thesis entitled "Studies on the Bioactive Constituents of Azadirachta Indica and Shorea Robusta" submitted by Sri Bharitkar Yogesh Pandharinath for Ph.D. (Engg./Pharm.) degree of this University. You are requesting to be present and evaluate the viva-voce examination of Sri Bharitkar Yogesh Pandharinath. The viva-voce examination will be held on 10<sup>th</sup> June (Tuesday) 2014 at 12:00 noon in the Seminar room, Department of Pharmaceutical Technology of Jadavpur University.

The University will be pleased to pay you a token honorarium of Rs.1000/- as a sitting allowance for conducting the viva voce examination.

Yours faithfully,

(Dr. B. Karmakar)  
Principal Secretary, F.E.T.

Copy to : Secretary, FET (File No. 136/12/Ph.)  
Records - 2  
Accounts Cell - 1

Sm.

\* Established on and from 24<sup>th</sup> December, 1955 vide Notification No.10986-Edn/IU-42/55 dated 6<sup>th</sup> December, 1955 under Jadavpur University Act, 1955 (West Bengal Act XXXIII of 1955) followed by Jadavpur University Act, 1981 (West Bengal Act XXIV of 1981)

DR. B. KARMAKAR  
PRINCIPAL SECRETARY



\*JADAVPUR UNIVERSITY  
KOLKATA-700 032, INDIA

Tag - 45/g

FACULTY COUNCIL OF ENGINEERING & TECHNOLOGY

Ref. No. D-7/E/412/12

Date: April 4, 2012

May 3,

To  
Dr. Ketousetuo Kuotsu,  
Assistant Professor,  
Pharm. Tech. Department,  
Jadavpur University,  
Kolkata – 700 032

X

Dear Sir/Madam,

You have been appointed internal examiner for the thesis entitled "Design, Development and Evaluation of Oral Novel Mucoadhesive Donut Shaped Captopril Tablets" submitted by Sri Asim Sattwa Mandal Ph.D.(Engg./Pharm.) degree of this University.

Copy of the thesis is being sent to you herewith.

It will be highly appreciated if you kindly send your thesis examination report to the Registrar, Jadavpur University, duly signed in the typed separate sheet/s according to the attached prescribed format in a confidential cover as early as possible, preferably within three months.

The University will be pleased to pay you a token honorarium of Rs. 300/- only for adjudication of the above thesis.

Yours faithfully,

( Dr. B. Karmakar )  
Principal Secretary, F.E.T.

Enclo.:

Copy to: Secretary, FET (File No. 30/08/Ph.)  
Accounts.  
Records -2

Smt.

\* Established on and from 24<sup>th</sup> December, 1955 vide Notification No.I0986-Edn/IU-42/55 dated 6<sup>th</sup> December, 1955 under Jadavpur University Act, 1955 (West Bengal Act XXXIII of 1955) followed by Jadavpur University Act, 1981 (West Bengal Act XXIV of 1981)

Tag 46



**Ph.D. Thesis submitted**

<b>Serial No.</b>	<b>Name</b>	<b>Project Title</b>	<b>Year of Submission</b>
1	Sweet Naskar	Design, development, characterization and evaluation of Metoprolol Succinate loaded Gelatin Nanoparticles.	2020

**Ph.D. Registered**

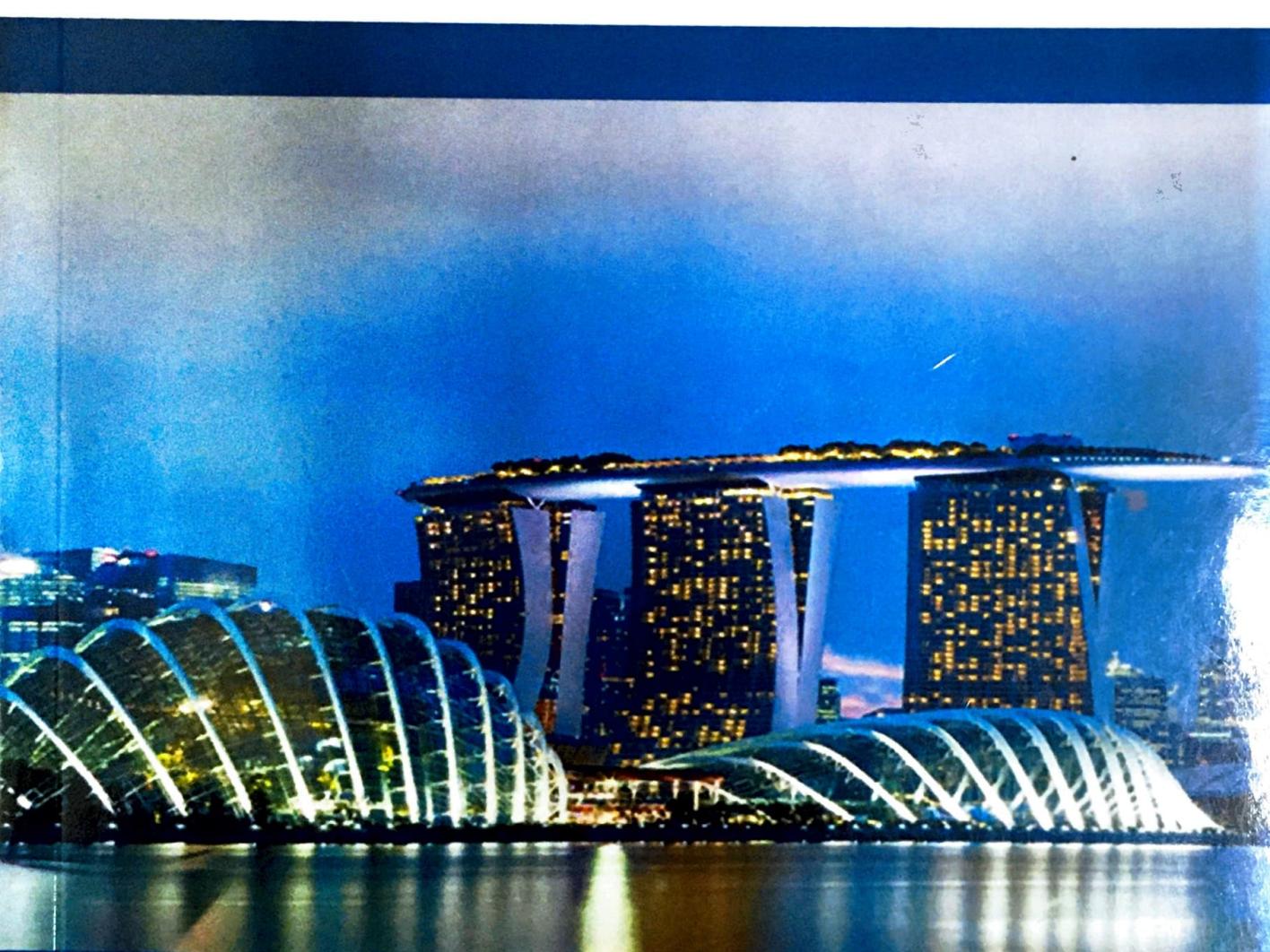
<b>Serial No.</b>	<b>Name</b>	<b>Project Title</b>	<b>Year of joining</b>
1	Piu Das	Fabrication and comparative evaluation of Curcumin and Paclitaxel loaded solid lipid nanoparticles: the pathway for effective cancer therapy.	2013 <input checked="" type="checkbox"/>
3	Suraj Sharma	Functionalized MWCNT's as carrier in cancer therapy- Fabrication, evaluation and toxicity profiling.	2015 <input checked="" type="checkbox"/>
4	Sanjit Kr. Roy	Design, formulation and evaluation of multiparticulate time programmed system of Ramipril for pulsed release: an approach in the management of early morning surge in blood pressure.	2015 <input checked="" type="checkbox"/>

Tag 48



# International Congress of Cancer & Clinical Oncology (CCCO-2019)

December 5-7, 2019 Singapore



Abstract Book

Hosting Organization      Operating Organization      Supporting Organization





## Title: Optimization and Evaluation Polymeric Microsphere Formulation for Colon Targeted Delivery of 5-Fluorouracil using Biocompatible Natural Gum Katira

Saumen Karan\*, Ketousetuo Kuotsu, and Tapan Kumar Chatterjee  
Senior Research Scholar  
Jadavpur University  
India

### Abstract

Controlled release delivery system of chemotherapeutic agents at the site of colon endorses modern drug-entrapped delivery tools, which release the entrapped agents at a controlled rate for an extended period providing patient compliance and additional protection from the gastric environment. The object the study was to develop oral site-specific rate-controlled anticancer drug delivery to pacify systemic side-effects and offer effective and safe therapy for colon cancer with compressed dose and duration of treatment. The double emulsion solvent extraction or solvent evaporation method was employed to encapsulate 5-fluorouracil. The utilizing processing parameters in this preparation were the amount of gum katira, stirring speed at the time of secondary emulsion formation, span 80, incorporation of co-polymer ratio (eudragit RS 100 and eudragit RL 100) and processing temperature at the time of preparation. The optimized microspheres were then characterized for drug loading, entrapment efficiency, SEM, and FTIR. To check the functionality of 5-FU loaded gum katira microsphere, cell cytotoxicity assay using MTT and DAPI staining (Fluorescence microscopy study) and in-vivo anticancer study of EAC and sarcoma 180 bearing mice were also tested. Histopathology of the liver and kidney and cell morphology of the EAC cell was also assessed. Formulated and optimized polymeric microsphere of 5-FU applying gum katira polymer own optimum physicochemical features, including a fine spherical particle, among a size of  $320.75 \pm 5.73 \mu\text{m}$ , excellent drug entrapment efficiency ( $74.87 \pm 1.76 \%$ ), and suitable release form of the drug within a time range of 12 h. In vitro, DAPI results pointed out that the blank microsphere conferred no cytotoxicity and 5-FU loaded microsphere revealed good efficacy. Significant decreases in EAC liquid tumors and sarcoma 180 solid tumors were observed, and increased life span of treated mice was seen ( $P < 0.05$ ). The rate of variation of cell morphology was more in 5-FU loaded microsphere than 5-FU injection. Hematological and biochemical parameter's results and histopathology of liver and kidney resulted that due to control released formulation have slow release rate, and that gives less trace on liver and kidney function. Finally, we foresee that polymeric microsphere of 5-FU applying natural gum katira could be an assuring micro-carrier for active colon targeting delivery tool with augmented chemotherapeutic efficacy and lowering toxic side effects against colon cancer.

### Biography

Mr. Saumen Karan completed his Graduation in Pharmacy from Jadavpur University, Kolkata, India, in 2007. After scoring 96.63 percentile in GATE (Graduate Aptitude Test Examination), he enrolled his name for Post-Graduate degree and completed with a specialization in Pharmacology from the University mentioned above in 2010. In 2013, he got *UGC-BSR Meritorious Fellowship* by University Grant Commission (UGC), Govt. of India, for further study. In the same year, he joined Jadavpur University as a research scholar for his Ph.D. program under the supervision of Prof. T. K. Chatterjee, where he is doing his research on the microsphere as a carrier in the anticancer drug delivery for especially colon cancer. Since 2012, he is functioning as a course coordinator at Clinical Research Centre, Jadavpur University, till to date. Now he is assisting a project as a Project Assistant of RUSA 2.0 under Govt. of India.

**Poster ID: CCCO16**

**Title: Surface Engineered Nanostructured Lipid Carrier Composite for the Oral Delivery of an Antimetabolite Drug**

**Ketousetuo Kuotsu**

Director

Clinical Research Centre, Jadavpur University  
India

***Abstract***

The aim of this study was to design and develop Nanostructured Lipid Carrier (NLC) composite for the oral delivery of an antimetabolite drug for cancer therapy. NLC was prepared by hot-melt emulsification and probe sonication technique with model drug Methotrexate (MTX) and further characterized by various parameters including FTIR, DSC, XRD, FESEM, and TEM. Moreover, efficacy of the NLC towards the human breast cancer cells (MCF-7) was studied by MTT assay. The particle size of the optimized NLC was found to be  $130.2 \pm 1.7$  nm and zeta potential of  $-28.5 \pm 2.3$  mV indicating stable formulation. The percentage Entrapment efficiency of MTX was found to be  $95.48\% \pm 0.13$ . FESEM and TEM images revealed outer and inner morphology with spherical shape and were in corroboration with particle size measurements. FTIR analysis of NLC proved the presence of amide bond in the lipid drug conjugate powder indicating the conjugation between drug and lipid. XRD data had shown the reduced intensity of drug and lipid peaks. In-vitro release of MTX from optimized NLC formulation showed biphasic pattern, burst or fast released  $42\% \pm 0.5$  drugs in first 8 h, and then the sustained release behavior  $66.45\% \pm 0.7$  of the for a period of 48 h. The first-order release kinetics was followed by optimized NLC formulation. Stability studies proved that the formulation was stable with shelf life of 90 days.

***Biography***

Dr. Kuotsu completed his doctorate in pharmaceutics with the theoretical and practical combination of novel drug delivery through nasal route at the Jadavpur University, India, in 2008. He joined Macleod Pharmaceuticals LTD. (Multi-National Company) as a Research Scientist and team leader in formulation and development. Then he joined as an assistant professor in the Department of Pharmaceutical Technology, Jadavpur University, Kolkata, India. He was awarded as a Fast Tract Scientist by Government of India Department of Science and Technology in 2009. Where he directed his research in the field of anticancer drug delivery. Recently, he joined as a Director of Clinical Research Centre, Jadavpur University, India, in 2018.

**Poster ID: CCCO17**

**Title: PEGylated-MWCNTs as a Carrier for Metronomic Chemotherapy: Design, Characterization and Pharmacokinetic Profiling**

**Suraj Sharma\*** and Ketousetuo Kuotsu  
Senior Research Fellow  
Jadavpur University  
India

**Abstract**

The purpose of this study was to design and develop polyethylene glycol (PEG) modified multiwall carbon nanotubes (PEGylated-MWCNTs) oral sustained release formulation as a metronomic chemotherapy. PEGylated-MWCNTs was prepared by acid treatment followed by modification with carbonyl chloride. Carboplatin (CP) was used as a model drug loaded on PEGylated-MWCNTs by Capillary driving force method. Enteric coating (EC) with cellulose acetate phthalate prevents drug degradation from acidic environment. The functionalization was evidenced by advanced analytical procedure such as FT-IR, XRD, TGA, TEM and dynamic light scattering techniques. In vitro release kinetics indicated the sustained release behavior of PEGylated-MWCNTs with  $r^2$  value of  $0.958 \pm 0.6$  for first order release kinetics. The result showed  $58.5 \pm 1.5\%$  of drugs was released in a pH responsive sustained manner at Simulated Intestinal Fluid (SIF) for a period of 24 hrs. Moreover, efficacy of the PEGylated-MWCNTs towards the cancer cells was performed by MTT assay in human breast cancer (MDA-MB-231) cells and compared to plain drug solution for 24 hrs. The results revealed that the  $IC_{50}$  value of prepared formulation were found to be  $252.74 \pm 1.3 \mu\text{g/ml}$ . The pharmacokinetic data revealed that the PEGylated-MWCNTs ( $AUC = 392.47 \pm 0.14$ ) significant enhancement in the oral bioavailability as compared to the commercially available intravenous injection Kemocarb® ( $AUC = 181.804 \pm 0.22$ ) containing an identical dose of CP. This formulation was successfully applicable for cytotoxic agents with high chemo-resistance and maximum adverse effect to improved efficacy and safety and provides a workable platform for metronomic chemotherapy.

**Biography**

Mr. Suraj Sharma completed his post-graduation in pharmaceutics subject with the theoretical and practical combination of drug delivery system at the Himalayan Pharmacy Institute, Sikkim University, in 2013. He joined same institute as an assistant professor for one year in 2013-2014. Then he was awarded by the Govt. of India, Department of Science and Technology-Inspired fellowship in 2015 for further study. He joined Jadavpur University as a research scholar for his Ph.D. program under the supervision of Dr. K. Koutsu, in 2015. where he is doing his research on the Carbon Nanotube as a carrier in the anticancer drug delivery till date.



**Poster ID: CCCO18**

**Title: Formulation, Characterization and Pharmacokinetic Study of Paclitaxel Loaded Gelatin Nanoparticles**

**Sweet Naskar\*** and Ketousetuo Kuotsu

Research Fellow

Jadavpur University

India

**Abstract**

The purpose of this study was to develop and evaluate of gelatin nanoparticles (GNPs) by nanoprecipitation method to increase paclitaxel (PTX) per oral bioavailability. Prepared GNPs were evaluated in terms of its properties such as particle size, zeta potential, entrapment efficiency, drug loading, *in vitro* drug release, morphology and *in-vivo* pharmacokinetic studies. The GNPs showed sustain drug release in phosphate buffer (pH 7.4) while less release in the 0.1 N HCl as compared to plain PTX. The *in vivo* pharmacokinetics study on rabbits showed a rise in the bioavailability of the GNPs by 2.27 folds as compared to marketed formulation. FTIR studies performed on the GNPs indicated no drug-polymer interaction. Nanoparticles (NPs) prepared by nanoprecipitation method were found to be clear (through SEM) and their mean particle size was in the range of  $59.83 \pm 0.14$  to  $156.41 \pm 0.19$  nm. The optimized formulation exhibited the highest entrapment of  $98.07 \pm 0.53$ . Zeta potential of all GNPs was in the range of 11.66 to 14.50 mV which indicates that they are moderately stable. Release study revealed that GNPs release drug at a sustained rate which assists in the absorption of PTX through the blood. Further, *in vivo* studies induced in increased bioavailability of the PTX which established the potential of developed carrier systems. Thus, it can be concluded that these prepared NPs might be one of the best preparation for the delivery of PTX for better therapeutic efficacy.

**Biography**

Mr. Sweet Naskar had completed his post-graduation in pharmaceutics with the theoretical and practical combination of drug delivery system from Jadavpur University in 2013. He joined as Junior Production Chemist at Jupiter Pharmaceuticals Limited, Kolkata, India, in 2013. After that, he was awarded by the Govt. of India, Rajiv Gandhi National Fellowship in 2014 for further study. He joined Jadavpur University as a research scholar for his Ph.D. program under the supervision of Dr. Ketousetuo Kuotsu in 2014 where he is doing his research on the gelatin nanoparticles as a carrier in the anticancer drug delivery till date.

Tag - 52

NATIONAL SEMINAR ON  
*CLINICAL RESEARCH: PRESENT  
SCENARIO IN PHARMACOVIGILANCE  
AND CLINICAL TRIALS*

**17<sup>th</sup> February 2018 Saturday**

**Venue: Dr. K. P. Basu Memorial Hall, Jadavpur  
University**

**ABSTRACT BOOK**



**Organised by:**

**Department of Pharmaceutical Technology,  
Jadavpur University**

**in association with**

**AMRI Hospitals, Dhakuria**

X

Presenter is different

JU-SEMINAR/P-10/2018

**Pulsed Delivery of Amoxicillin Trihydrate in Solid Oral Dosage Form: An in  
Vitro Evaluation Model**

PRATIK CHAKRABORTY, Department of Pharmaceutical Technology, Jadavpur  
University

Dr Ketousetuo Kuotsu, Assistant Professor, Department of Pharmaceutical  
Technology, Jadavpur University

e-mail id: pratik.chakraborty88@yahoo.com

**ABSTRACT**

Chronobiology is the study of biological rhythms and the mechanism of biological time keeping. Pulsatile drug delivery refers to time specific, site specific delivery of drugs in accordance with the circadian rhythm of the body. Several diseases like hypertension, peptic ulcer, arthritis etc show definite circadian rhythm that can be treated by use of pulsatile drug delivery system. Amoxicillin is a penicillin antibiotic which is used to treat different bacterial disorders. It is also used to treat H. pylori induced ulcer in combination with other drugs. A three pulse release amoxicillin oral delivery system can be designed to increase patient compliance. Initial burst release is achieved by formulating a tablet with superdisintegrants sodium starch glycolate and crosscarmellose sodium. For the second pulse, a lag time of 2 to 2.5 hours is achieved by means of film coating the tablet with ethyl cellulose and PEG 6000 dissolved in suitable solvent in different ratios. In this model, the third pulse is designed to release drug after a lag time of 4.5 to 5 hours. For this, pH sensitive delivery system is found to be very useful. Gastric pH is about 1.2 and gastric transit time is about 3 hours. The pH of the small intestine is about 6.8. This difference in pH is exploited to modulate drug release.

**Keywords:** chronobiology, circadian rhythm, pulsatile drug delivery, amoxicillin

FORM No. 9  
(See Rule 9)

SI.No. 033487

**GOVERNMENT OF NAGALAND**  
**DEPARTMENT OF ECONOMICS & STATISTICS**

issued under Section 12

**CERTIFICATE OF BIRTH** issued under Section 17 of the Registration of Births and Deaths Act 1969.

This is to certify that the following information has been taken from the original record of birth which is in Register for Kohima (Local area)

of Circle/Block Kohima of District Kohima of State of NAGALAND

Name Retousetno Kuotsu

Sex Male

Date of Birth 16th June '79 Registration No. 434 of 1994

Place of Birth Kohima Date of Registration 7th June '94

Name of Father/Mother R. Kuotsu

Permanent address of Father/Mother D.T. Ch. Kohima Village



*[Signature]*  
Signature of Births & Deaths Unit  
Signature of Issuing Authority  
District

Enclosure A/2

  
**JADAVPUR UNIVERSITY**  
 PAYSLIP FOR THE MONTH OF November, 2020

EMP ID : 080032		DEDUCTIONS	
NAME : KETOGURU KUMAR		GPF SUBSCRIPTION	8425.00
DESIG : ASST. PROFESSOR		VIS	4000.00
DEPT : PHARMACY		PF ARREAR	0.00
PAN : ANVPKD011B		LOAN + INTEREST [ 0.00 + 0.00 ]	0.00
(PAY LEVEL : 12 BASIC : 101100)		COOPERATIVE CREDIT SOCIETY , ID NO. 2418	
		LOAN + INTEREST [ 9167.00 + 0.00 ]	9167.00
		T.FUND	1000.00
		IT TDS DEDUCTION	13400.00
		PROFESSIONAL TAX	200.00
		S.C/H.R	2000.00
		ELECTRICITY	225.00
		EXCESS SALARY	0.00
		GROUP INSURANCE (GSLI)	400.00
		S.S SCHEME (LIC)	0.00
		P.L.I (PO)	0.00
		JU GROUP MEDICAL INS. PREMIUM ID. NO. 2858	3007.00
		S.H.I. H.R LOAN	0.00
		S.H.I P/L	0.00
		DHAKURIA COOP. BANK HRL	0.00
		DHAKURIA COOP. P/L	0.00
		JU TRACHER MED. AID FUND	0.00
		FESTIVAL ADVANCE RECOVERY	0.00
		MISC DEDUCTION (1)	0.00
		MISC DEDUCTION (2)	0.00
GROSS AMOUNT PAYABLE : 113600.00		TOTAL DEDUCTION : 41824.00	
(SALARY BOOK : ENGG-II, Page No. : 124) Bank A/c No. : 11079897495		[ATTN -> 30.0 Days] NET AMOUNT PAYABLE : 71776.00	

Amount in Words : Rupees Seventy One Thousand Seven Hundred Seventy Six Only

\* In case of any discrepancy noticed in this pay slip, it must be brought to the notice of the Finance Officer within 7 days.

\* NOTE

This is requested to all concerned to check the Tax deduction figures and coordinate with Pay Section, Quoate Emp. ID in all the correspondences. Pay fixation and related issues be reminded, if not solved this month.

জাদাপুর বিশ্ববিদ্যালয়  
কলকাতা-৭০০০৩২, ভারত



\*JADAVPUR UNIVERSITY  
KOLKATA-700 032, INDIA

Ref. No.: P-1/1552/16  
Dated : 5-Dec-16

০৮

**Dr. Ketousetuo Kuotsu**  
Assistant Professor  
Department of **Pharmaceutical Technology**  
Jadavpur University  
Kolkata - 700032

Dear Sir,

I am directed to inform you that you have been promoted to the post of **Assistant Professor (Stage - 2)** in the Department of **Pharmaceutical Technology** of this University with effect from **16.05.2012** under Career Advancement Scheme of Teachers in terms of G.O. No.1197(28)-Edn(U)/IU-41/II(Pt) dated 31.12.2012 and G.O. No.962-Edn(U)/IU-41/II(Pt) dated 05.10.2015 in the **Pay Band - 3 (Rs.15,600 - 39,100/-)** with **Academic Grade Pay of Rs. 7,000/-** and usual admissible allowances applicable to the University in partial modification of the University Order No. REC/N/310/2015 dated 16/23.09.2015.

Please acknowledge the receipt and submit a joining report.

Yours faithfully,

A handwritten signature in black ink, appearing to read "Omgi Shyam Ray".  
REGISTRAR

Enclosure A/4

যাদবপুর বিশ্ববিদ্যালয়  
কলকাতা-৭০০০৩৬, ভারত



\*JADAVPUR UNIVERSITY  
KOLKATA-700 032, INDIA

Ref. No.: P-1/1024/18  
Dated : 18-Jul-18  
20

DR. KETOSETUO KUOTSU

Assistant Professor  
Department of **Pharmaceutical Technology**  
Jadavpur University  
Kolkata - 700032

Dear Sir,

I am directed to inform you that you have been promoted to the post of **Assistant Professor (Stage - 3)** in the Department of **Pharmaceutical Technology** of this University with effect from **16.05.2017** under Career Advancement Scheme of Teachers in terms of G.O. No.1197(28)-Edn(U)/IU-41/II(Pt) dated 31.12.2012 and G.O. No.962-Edn(U)/IU-41/II(Pt) dated 05.10.2015 in the Pay Band - 3 (**Rs.15,600 - 39,100/-**) with Academic Grade Pay of **Rs. 8,000/-** and usual admissible allowances applicable to the University.

Please acknowledge the receipt and submit a joining report.

Yours faithfully,

  
19.7.18  
REGISTRAR

SCHEDULED CASTE / TRIBE CERTIFICATE

This is to certify that Shri/~~Sonam~~ KETOUSETUO KUOTSU  
 son/daughter of Shri/~~St.~~ R. KUOTSU village/town  
KOHIMA in the District KOHIMA:  
ANGAMI  
 of the state of Nagaland belongs to the tribe/Gam which is recognised as Schedule Tribe/ Caste under  
 Schedule Caste/Schedule Tribe List (modification)order 1956  
 read with the Bombay Re-organisation Act, 1960 and the Public  
 Re-organisation Act, 1960. The constitution of Nagaland Schedule  
 Tribe Act, 1970.

Shri/~~Sonam~~ KETOUSETUO KUOTSU and his/her  
 family ordinarily/permanent resides in Village /Town  
KOHIMA district of the state of Nagaland.

PLATE OF THE DEPUTY COMMISSIONER  
 Date : -  
 Office seal.

Signature \_\_\_\_\_  
 Designation \_\_\_\_\_  
 Office of Deputy Commissioner  
 Kohima District  
 Nagaland

State /Union Territory

Note:- Please deleted the word's which are not applicable.  
 The term ordinarily resides used here will have the  
 same meaningas in Section 20 of the Representation  
 people Act, 1950

Enclosure A/5

		Nagaland Board of School Education, Kohima		Dated Kohima																																																											
		High School Leaving Certificate Examination, 1994		The.....																																																											
<p>This is to certify that Mr. Alu Melawetina Kipotsua Roll No. 1843 of Kohima  <i>Gangkhar Gobardhan Chakravarthy</i> has secured marks as detailed below in the High School Leaving Certificate Examination, 1994.</p>																																																															
<table border="1"> <thead> <tr> <th rowspan="2">Subject</th> <th colspan="2">First Lang</th> <th colspan="2">Second Lang</th> <th rowspan="2">Total</th> </tr> <tr> <th>Full marks</th> <th>P. marks</th> <th>Full marks</th> <th>P. marks</th> </tr> </thead> <tbody> <tr> <td>Maths I</td> <td>100</td> <td>65</td> <td>100</td> <td>62</td> <td>127</td> </tr> <tr> <td>Maths II</td> <td>100</td> <td>62</td> <td>100</td> <td>62</td> <td>127</td> </tr> <tr> <td>A. &amp; D. Sc. I</td> <td>100</td> <td>69</td> <td>100</td> <td>62</td> <td>131</td> </tr> <tr> <td>A. &amp; D. Sc. II</td> <td>100</td> <td>64</td> <td>100</td> <td>60</td> <td>124</td> </tr> <tr> <td>S. Sciences I</td> <td>100</td> <td>60</td> <td>100</td> <td>58</td> <td>118</td> </tr> <tr> <td>S. Sciences II</td> <td>100</td> <td>58</td> <td>100</td> <td>56</td> <td>114</td> </tr> <tr> <td>Total</td> <td>400</td> <td>200</td> <td>400</td> <td>200</td> <td>400</td> </tr> <tr> <td><b>Grand Total</b></td> <td><b>152</b></td> <td><b>79</b></td> <td><b>152</b></td> <td><b>79</b></td> <td><b>152</b></td> </tr> </tbody> </table>						Subject	First Lang		Second Lang		Total	Full marks	P. marks	Full marks	P. marks	Maths I	100	65	100	62	127	Maths II	100	62	100	62	127	A. & D. Sc. I	100	69	100	62	131	A. & D. Sc. II	100	64	100	60	124	S. Sciences I	100	60	100	58	118	S. Sciences II	100	58	100	56	114	Total	400	200	400	200	400	<b>Grand Total</b>	<b>152</b>	<b>79</b>	<b>152</b>	<b>79</b>	<b>152</b>
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Grade B Very good (60% to 74%)			Controller of Examinations: <i>S. S. P. W.</i>																																																												
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		Controller of Examinations <i>Sharma</i>																																																																																																																																																																																																						

No. BP4 22

**DIBRUGARH UNIVERSITY**



✓  
4th Year B. Pharm Examination (Regular/Suppl) Marks, 2000.1.

The following are the Marks secured by Mr. ketonsetuo kuotsu  
 Roll No. 2 of Department of Pharmaceutical Sciences, Dibrugarh University  
 in the 4th Year B. Pharm Examination, 2000.1 held in Nov. - Dec. 2000

Subjects	Theory 75	Sessional 25	Total 50/100	Practical 75	Sessional 25	Total 50/100	Theory & Practical Total	RESULT
Pharmaceutical Analysis-II	57	17	74	54	21	75	149	
Medicinal Chemistry-II	53	17	70	56	18	74	144	
Pharmaceutical Technology-II	46	17	63	43	16	59	122	
Biological Pharmacy	49	18	67				67	
Biopharmaceutics	46	18	64				64	
Hospital Pharmacy & Industrial Management	51	20	71				71	
Pharmacognosy-III	56	18	74	43	20	63	137	
Pharmacology II	49	17	66	52	18	70	136	
Dissertation and Comprehensive Viva Voce			50/100				70	
Industrial/Hospital Pharmacy Training Report			25/50				35	
Total 4th Year	725	1450					995	
Total 3rd Year	725	1450					960	
Total 2nd Year	675	1350					880	
Total 1st Year	650	1300					934	I
GRAND TOTAL			2775/5550				3769	

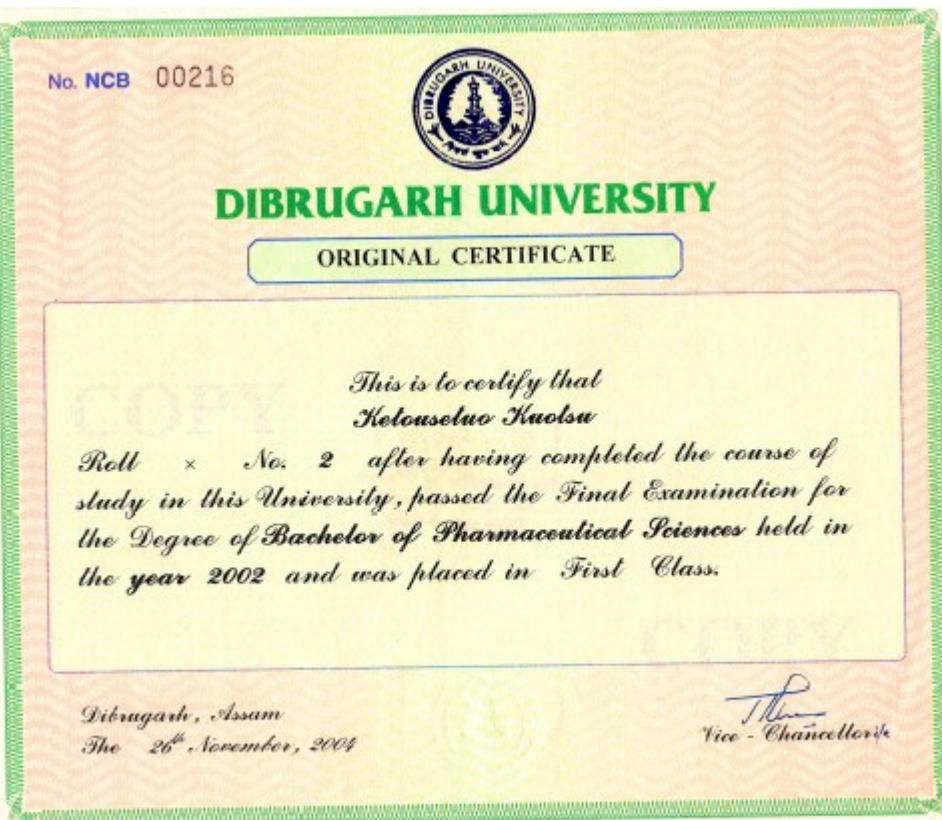
First Tabulator

Second Tabulator

Asst. Registrar (Exams)

Dibrugarh University

Date 02 APR 2002







JADAVPUR UNIVERSITY B-011816

KOLKATA-700 022  
MARK SHEET

(Degree Course)

Enclosure A/11

M. PHARM	Examination 2004
3RD & 4TH SEMESTER	held in JUNE, 2004
Name KETOSETUO KIOTSU	
Examination Roll No. M. PH-320	
Registration No. 83318	of 2002-2003
Subject	Marks
THESIS (200) VIVA (100)	187 93
1ST SEMESTER (500) 2ND SEMESTER (500)	309 362
Total Marks 851 (out of 1300)	) Remarks FIRST CLASS
Prepared by A.	Checked by C.
Date of issue 24 JUN 2004	 Controller of Examinations
1st Class 65% and above, 2nd Class 50% and above but below 65%	

20040986



## Jadavpur University

Certified that Sri / Sm. Ketousetuo Kuotsu  
having passed the Final Examination of 2004 held in the year 2004, has been  
admitted to the Degree of Master of Pharmacy with all the Rights and  
Privileges thereto appertaining at the Convocation held in 2004 and that he/she  
was placed in First Class.

In Witness whereof the Signature of the Vice-Chancellor of  
Jadavpur University is herunto affixed.



*A. Basu*

20080097



## Jadavpur University

*Certified that*

**Sri Ketousetuo Kuotsu**

was admitted to the Degree of Doctor of Philosophy in Pharmacy of this University on 08/02/2008 and that the degree was conferred on him / her at the Convocation held in December 2008 with all the Rights and Privileges thereto appertaining.

In Witness whereof the Signatures of the Chancellor and the Vice-Chancellor of Jadavpur University are hereunto affixed.

P. N. Chakraborty

Vice-Chancellor  
The 24th December, 2008

A handwritten signature of P. N. Chakraborty.

Chancellor



X

Enclosure A/14



**MAC/APPOINTMENT/DIR/2007**

**01/02/2008**

**Mr KETOSETUO KUOTSU  
TRAINEE - RES. SCIENTIST  
F & D - Department**

**Dear Mr KETOSETUO KUOTSU**

We are pleased to appoint you as RESEARCH SCIENTIST w.e.f. 01/02/2008.

1. Your pay will be Rs.40000/- ( FOUR LAKH EIGHT RUPEES ONLY) per annum. Breakup of your salary annexed herewith.
2. Provident fund, Gratuity etc. shall be applied as per the company rules in force from time to time.
3. Increments and Promotions are on the basis of merit and will be at the sole discretion of the company.
4. You will be on probation for a period of 3 months from the date of joining. This period may be extended at the discretion of the company to enable you to achieve the expected standard of performance. At the end of probation period, you will be either (a) confirmed in the services of the company or (b) if your performance is not up to the company or (c) if your performance is up to the expected standard, terminated from such services.
5. On confirmation, your services will be liable to be terminated after giving one month's notice or one month's notice pay in lieu of notice period from either side.
6. You shall be retired from the services of the company on attaining the age of 58 years and shall not have any claim to be continued in service thereafter.
7. You will be governed by the " Standing Orders" applicable to the establishment and rules & regulations in force in which you work and Rules and Regulations framed, amended, altered or modified from time to time and applicable to the employees of that establishment.
8. Apart from your usual duties, your activities will also extend over any other kind of work as may be required by the circumstances.
9. Your usual working hours will be 48 hours per week. However, you may be required to stay beyond these hours whenever required and called upon by the management due to emergencies of work.

**MACLEODS  
PHARMACEUTICALS  
LIMITED**

Regd. Office : Atlanta Arcade, Church Road,  
Near Leela Hotel, Andheri-Kurla Road,  
Andheri (East), Mumbai-400 059, India.  
Phone : 91 - 22 - 6676 2800  
Fax : 91 - 22 - 2925 6599  
Cable : 'FORECOX' Mumbai-400 059.  
Email : macleods@vsnl.com

Works :  
Plot No. 1 & 2, Mahim Road,  
Palghar (West), Thane-401 404,  
Maharashtra State, India.

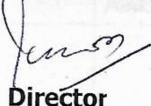
10. In the event of working on shift basis, it may be necessary for you to work on any shift allotted to you. There is no special allowance payable for working in the night shift or for any other shift.
11. You should be prepared to serve any department of the company and anywhere in India, if posted
12. Your services are liable to be transferred either part time or whole time to any other department/division/branch (place)/or sister companies within India under the management of this company as and when desired by the management.
13. You will not directly or indirectly engage in any other work, business or employment part time / full time in any capacity whatsoever. During the period of this appointment, you will not secure or secure any other post without the previous consent of the management in writing.
14. You shall not associate with any organisation or be the member of a body, which in the opinion of the company would be detrimental to its interests. The decision of Company shall be final in the connection. You shall, therefore, obtain written permission from the Company for Undertaking any part time studies or before obtaining membership of any part time studies or before obtaining membership of any organisation of whatsoever kind.
15. You will not during your employment divulge or even thereafter make use for your own or for whatever purpose of any information or knowledge obtained by you during your employment as to business or affairs of the employer of this method or as to any trade secrets or secret processes, patented processes owned by the employer of your personal matter concerning your employment.
16. You are to keep and render a faithful account of all properties of the company entrusted to you in the course of your employment. You will not remove/copy anything from the office premises particular, any business papers, electronic data, floppies, compact discs, drawings or whatsoever which you might come to know acquire possession of directly or indirectly to any during your services or even thereafter
17. You shall not accept loan or any gift or money from any persons working under your supervision or persons with whom the employer has any business relations.
18. You will use/operate all electronic, automation equipments like personal computer, software programming units, photocopier, telephone, internet to the best of your abilities, as part of normal work and exclusively for the Companies business purpose only.
19. Your appointment will be subject to the verification of your service record and antecedents. In case any information furnished by you in connection with the above appointment is found incorrect at any stage or correct information is found suppressed, you are liable to be removed from the services at any time without any notice.
20. That all disputes and differences are to be inquired and to be dealt with and are to be settled at Mumbai. And that the courts, tribunals and/or authorities at Mumbai only shall have to entertain, try and decide such disputes or differences arising out of or pertaining to this appointment.

If you accept the terms and conditions above mentioned, please sign the declaration in the duplicate and return to us. You shall retain the original.

We welcome you as a member of our organization and look forward to a fruitful collaboration.

With best wishes,

**For Macleods Pharmaceuticals Ltd.**

  
Director

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**ENDORSEMENT OF ACCEPTANCE**

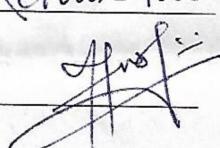
I agree to accept employment on the terms and conditions above mentioned. The original of this letter is in my possession.

Place: Mumbai

Date: 01. 08. 2007

Name: Ketausefuo Kuo fsu

Sign:



X

**Date : 13/05/2008**

**To whomsoever it may concern**

This is to certify that Mr. KETOSETUO KUOTSU was working in our organisation as RESEARCH SCIENTIST in PDR Department at R&D Center from 01 August 2007 to 12 May 2008.

During the tenure of his service we found him sincere and hardworking.

**For Macleods Pharmaceuticals Limited**

*Saidutta Nanda*  
**Saidutta Nanda**  
**DGM-HR**



QIP NODAL CELL (PHARMACY)  
DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY

Jadavpur University

KOLKATA - 700 032

This is to certify that Dr./Smt./Shri..... Mukherjee.....

has participated in the Two / Four Week(s) Long Refresher Course on "Progress in Pharmaceutical

Research and Technology" of Quality Improvement Programme (Q.I.P) during the period from

18th August 2008/~~1st September 2008~~ to 30th August 2008/ 13th September 2008 under the auspices of

A.I.C.T.E.

B. Mukherjee  
(B. MUKHERJEE)

Coordinator  
QIP Nodal Cell (Pharmacy)  
Department of Pharmaceutical Technology  
Jadavpur University

T.K.  
(T. K. PAL)

Head  
Department of Pharmaceutical Technology  
Jadavpur University

M.K.  
(M. K. MITRA)

Dean, Faculty of  
Engineering & Technology  
Jadavpur University

## UNIVERSITY GRANTS COMMISSION

UGC - ACADEMIC STAFF COLLEGE  
JADAVPUR UNIVERSITY



## UGC SPONSORED REFRESHER COURSE

*This is to certify that*

Dr. Debkumar Bhattacharya

(NAME OF PARTICIPANT)

Lecturer

(DESIGNATION)

Jadavpur University

(COLLEGE / UNIVERSITY)

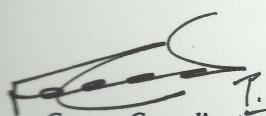
Kolkata

(PLACE)

participated in the Refresher Course in the subject Thrust Areas  
on Development of Natural Products

from November 20 to December 10, 2008

and obtained Grade A.

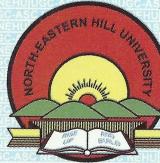
  
T. Sinha  
Course Co-ordinator  
Director

Date : 10.12.2008

  
Jitendra Kumar  
Vice-Chancellor / Registrar



**UNIVERSITY GRANTS COMMISSION  
ACADEMIC STAFF COLLEGE**



**NORTH-EASTERN HILL UNIVERSITY  
SHILLONG - 793022**

**UGC-SPONSORED ORIENTATION PROGRAMME**

This is to certify that

**Assistant Professor**

(Designation)

**Dr. Ketusetuo Kuotsu**

(Name of Participant)

**Kolkata**

**Jadavpur University**

(College/University)

affiliated to Jadavpur University, Kolkata

participated in the 13<sup>th</sup> Orientation Programme from 16<sup>th</sup> February, 2011

to 15<sup>th</sup> March, 2011 and obtained grade A.



R. mosen  
**Director**

D. Kharab.  
**Coordinator**

D. Kharab.  
**Vice-Chancellor**

UNIVERSITY GRANTS COMMISSION  
Human Resource Development Centre (HRDC)

Jadavpur University  
Kolkata



UGC Sponsored Short Term Course

This is to certify that... *Ketousetuo Kuotsu* ..... *Assistant Professor.III* .....

(Name of the Participant)

(Designation)

..... *Jadavpur University* ..... *Kolkata* .....

(College/University)

(Place)

affiliated to..... University, has

participated in the Workshop on MOOCs, e-content development and Open Educational Resources from 11th February 2020 to 17th February 2020, organized by School of Media, Communication and Culture and C-MATER, Department of Computer Science & Engineering, Jadavpur University.

A handwritten signature in black ink, appearing to read "Rajat Chakraborty".

Director

Date: 17th February 2020

A handwritten signature in black ink, appearing to read "Abhijith Ray Subhadip Basu".

Coordinator