**BIO-DATA**

**Dr Deepak Kumar (PhD)**

Junior Demonstrator(Teaching post)

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**Google Scholar Profile:** <https://scholar.google.com/citations?user=_b1k2K8AAAAJ&hl=en>

**Research gate Profile:** <https://www.researchgate.net/profile/Deepak-Kumar-73>

**Educational Qualification:**

* PhD, Life Sciences (Biotechnology), PGIMER, Chandigarh 2016-2021
* Masters of Science (Biotechnology), Panjab University, Chandigarh 2011-2013
* Bachelors of Science (Biotechnology) HONS. Panjab University 2008-2011

**Technical Expertise:**

* Computational biology: Protein ligand interactions like Molecular Docking (Flexible and semi-flexible docking), MD simulations, small ligand designing.
* Spectroscopic techniques: Spectrophotometry and spectrofluorimetry
* Molecular biology techniques: Gel electrophoresis (Native PAGE, SDS-PAGE, Agarose gel), PCR (Conventional & real time), LAMP (Loop mediated isothermal amplification) assay.
* Enzymatic Assays: kinetic parameters- Km, Vmax & Kcat.
* Currently studying the effect of protein modifications on enzymatic activity of albumin and other relevant enzymes using MALDI-ToF and LC-MS. Also, studying the effect of bisphenols on the genome of commensal bacteria using Next Generation Sequencing.

**Scientific/Academic expertise:**

* Generation of hypothesis and experimental study design to validate the hypothesis.
* Proposal writing for funding, manuscript preparation, etc.
* Good communication and supervisory skills.
* Currently teaching Postgraduate students

**Experience:**

* Junior Demonstrator Teaching and Research work Jan 2021 to till date

(Teaching post)

PGIMER, Chandigarh

* Senior Research Fellow Research work Jan 2018 to Dec 2020

PGIMER, Chandigarh

* Junior Research Fellow Research work Jan 2016 to Dec 2017

PGIMER, Chandigarh

**Techniques known:**

* Molecular Docking (GOLD and Autodock), MD simulations (GROMACS)). Designing of peptide/ligand using Accelyrys Discovery studio. Tools/softwares like GRASP2, Pymol, etc. Used to both Ubuntu and windows operating system.
* Gel electrophoresis (Native, SDS-PAGE, agarose, agar, starch gel)
* Spectroscopic techniques (spectrophotometry, spectrofluorimetry)
* Polymerase chain reaction (PCR: Conventional & real time PCR), LAMP assay
* MALDI-TOF (data analysis using Mass-Up) and LC-MS (data analysis using MaxQuant software)
* NGS (Next Generation Sequencing) data analysis using Unipro UGENE
* Chromatography (Paper, Thin layer & Gel filteration chromatography)
* Basic techniques of microbiology (culturing of microoraganisms, growth curve analysis, staining, identification of microorganisms, etc.)
* Basic tests of biochemistry, clinical biochemistry (estimation of lipid profile parameters; sugar; protein; albumin, urea, creatinine, etc.)
* Basic techniques of Immunology (radial immunodiffusion, Ouchterlony double immunodiffusion, ELISA, etc.)

**Details of Professional Recognitions, Awards and Fellowships received**

2021 Best Poster award in 47th Annual Conference of Association of Clinical Biochemists of India (ACBICON 2021)

2020 Qualified national level examination for the post of Demonstrator (Teaching post) conducted by PGIMER, Chandigarh, India .

2018-2020 Senior Research Fellowship (SRF) from CSIR, Government of India.

2016-2017 Junior Research Fellowship (JRF), by CSIR, Government of India

2016 Qualified Graduate Aptitude Test Examination (GATE) with 96.8 percentile in an all India Exam.

2015 Qualified and secured 79th rank in CSIR NET (JRF) conducted jointly by CSIR and UGC, New Delhi, India

2015 Qualified and secured 23rd Rank in National level PhD entrance exam conducted NDRI, Karnal, India.

2015 Qualified and secured 83.37 percentile in GATE 2015, India

**List of publications**

**Research papers**

1. **Kumar D**, Banerjee D. Methods of albumin estimation in clinical biochemistry: Past, present, and future. ClinChimActa. 2017;469:150-160. **Impact factor: 3.786**

2. Nagra S, **Kumar D**, Bhattacharyya R, et al. Designing of a penta-peptide against drug resistant E. coli. Bioinformation. 2017;13(6):192-195.

3. **Kumar D**, Behal S, Bhattacharyya R, Banerjee D. Pseudoesterase activity of albumin: A probable determinant of cholesterol biosynthesis. Med Hypotheses. 2018;115:42-45. **Impact factor: 1.538**

4. **Kumar D**, Singh V, Behal S, et al. Plasma Hydrogen Peroxide: A Myth or Reality? Ind J ClinBiochem. 2019 Jan;34(1):118-119.

5. **Kumar D**, Behal S, Bhattacharyya R, Banerjee D. β-Naphthyl Acetate in Acetone Produces a Dark Background for Staining of Esterase Activity on Gel. Indian J ClinBiochem. 2019 Apr;34(2):240-242.

6. Kafle JK, Bhardwaj B, Kaur R, **Kumar D**, Banerjee D. A Staining Protocol of Proteins on Agarose Gel with Amido Black. Acta Scientific Medical Sciences. 2018; 2: 59-63.

7. Narwal M, **Kumar D**, Maniar K, Bhattacharyya R, Banerjee D. Albumin binding: an important parameter to study for drugs with low therapeutic index. J Transl Sci. 2018; 4.

8. Narwal M, **Kumar D**, Mukherjee TK, Bhattacharyya R, Banerjee D. Molecular dynamics simulation as a tool for assessment of drug binding property of human serum albumin. MolBiol Rep. 2018 Dec;45(6):1647-1652. **Impact factor: 2.316**

9. Meena A, **Kumar D**, Bhattacharyya R, Banerjee D. Glucometer for Pharmacological Glycosuria. CurrSci Res Biomed Sciences 2018, 1(1): 180002.

10. Meena A, **Kumar D**, Bhattacharyya R, Banerjee D. Aspirin to Prevent CAD: Not Beyond Trials. Acta Scientific Medical Sciences. 2018;2:31-32.

11. Mittal A, Singh V, Chowdhary S, Moideen A, **Kumar D**, et al. The Effect of Recombinant Human Erythropoietin on Bacterial Growth: A Dual-Edged Sword. Kidney Dis (Basel). 2019 Mar;5(2):81-90. **Impact factor: 3.222**

12. Kumari M, **Kumar D**, Banerjee D. Microalbuminurea Detection: The Future Challenges. Acta Scientific Medical Sciences. 2019;3:01.

13. **Kumar D**, Singh S, Kaur S, et al. Rifampicin and Isoniazid behave as non-creatinine chromogens and interfere with Jaffe’s reaction: A phenomenon with the potential to give a false-positive result in creatinine estimation. Indian J Tuberc. 2020 Apr;67(2):253-256.

14. Kumari M, Bhardwaj B, **Kumar D**, Bhattacharya R, Banerjee D. Coomassie Brilliant Blue can visualize a protein band without destaining: a quick visualization protocol on the agarose gel. Ind J ClinBiochem 36, 248–249 (2021). <https://doi.org/10.1007/s12291-020-00874-w>

15. **Kumar D**, Gupta P, Banerjee D. Letter: does vitamin D have the potential role against COVID-19? Aliment PharmacolTher . 2020 Jul;52(2):409-411. **Impact factor: 8.171**

16. **Kumar D**, Behal S, Bhattacharyya R, Banerjee D. Fast Blue B Produces a Light Background on the Gel Surface. Ind J ClinBiochem (2020). https://doi.org/10.1007/s12291-020-00913-6.

17. Jain S, Kaur S, **Kumar D**, Bhattacharyya R, Banerjee D. Plastics, Bisphenol and COVID: Bisphenol B is Necessarily not Better than Bisphenol A. Acta Scientific Medical Sciences, 2021; 5(3):1-2.

18. **Kumar D**, Bhattacharyya R, Banerjee D. Pseudosterase Activity-Based Specific Detection of Human Serum Albumin on Gel. Talanta. 2021 Mar 1;224:121906. doi: 10.1016/j.talanta.2020.121906. **Impact factor: 6.057**

19. **Kumar D**, Singh S, Yadav D, et al. Prediction of remdesivir resistance in COVID-19 illness: Need for development of clinical laboratory test. Indian J ClinBiochem. 2021 Jun 10:1-2.

20. **Kumar D**, Bhattacharyya R, Banerjee D. Fluorimetric method for specific detection of human serum albumin in urine using its pseudoesterase property. Anal Biochem. 2021 Nov 15;633:114402. **Impact factor: 3.365**

21. Surender, Kaur S, **Kumar D**, et al. Detection of Human Serum Albumin on Gel from Sample Obtained from Different Cardiopulmonary Bypass (CPB) Filtrates in a Patient on Cardiopulmonary Bypass Surgery. Ind J Clin Biochem (2022). <https://doi.org/10.1007/s12291-022-01025-z>

22. Surender, Kumar R, Chowdhary S, **Kumar D**, et al. Whether heparin causes hemolysis: An in-silico and in-vitro study. Indian Journal of Thoracic and Cardiovascular Surgery (Accepted for publication).

**Preprints**

23. Kaur S, Yadav D, Singh S, Kumari M, **Kumar D**, Syal K, et al. Selocalcitol: Scope of inhalational formulation for prevention and cure of COVID-19 illness. Research Square. 2020. Available at <https://www.researchsquare.com/article/rs-63402/v12>

24. Chawdhary S, **Kumar D**, Bhattacharyya R, Banerjee D. Prediction of binding of FDA approved drug Ledipasvir to SARS-CoV2 mutants: an in silico study. Research Square 2021. Available at <https://www.researchsquare.com/article/rs-882289/v1>

**Book chapters:**

25. Maniar K, Singh V, **Kumar D**, Moideen A, Bhattacharyya R, Banerjee D. Metformin: A Candidate Drug to Control the Epidemic of Diabetes and Obesity by Way of Gut Microbiome Modification. In: Faintuch J, Faintuch S, eds. Microbiome and Metabolome in Diagnosis, Therapy, and other Strategic Applications. London,United Kingdom: Academic Press; 2019. p. 401-408 (Available at <https://www.sciencedirect.com/book/9780128152492/microbiome-and-metabolome-in-diagnosis-therapy-and-other-strategic-applications#book-description>).

26. Singh V, **Kumar D**, Chowdhary S, et al. Ligand-based designing of natural products. In: Sharma A, eds. Bioactive natural products for the management of cancer: From bench to bedside. Springer, Singapore; 2019.

27. Singh V, **Kumar D**, Chowdhary S, et al. Mechanistic insight into cancer aetiology and therapeutic management by natural metabolites. In: Sharma A, eds. Bioactive natural products for the management of cancer: From bench to bedside. Springer, Singapore; 2019.

**Conference Proceedings**

1. **Kumar D**, Maniar K, Moideen A, Bhattacharyya R, Banerjee D. Pseudoesterase activity of human serum albumin (HSA) and binding of ester substrates. 49th Annual conference of Indian Pharmacological society 20-23rd October 2016, pg158.

2. **Kumar D**, Bhattacharyya R, Banerjee D. Ideal substrate for pseudoesterase activity of human serum albumin: an in-silico study. ACBICON 2016. Ind J ClinBiochem, 2016; 31 (S1), S80.

3. **Kumar D**, Bhattacharyya R, Banerjee D. Whether Albumin always acts as Pseudoesterase? Insights from In-Silico observations. Annual symposium of indian biophysical society 22-25 March 2017. Pg 75.

4. **Kumar D**, Narwal M, Bhattacharyya R, Banerjee D. Pseudoesterase Activity of Human Serum Albumin: Analysis By Docking And Molecular Dynamics Stimulation Pseudoesterase activity. ACBICON 2017. Ind J ClinBiochem 2017, 32(S1), S132.

5. **Kumar D**, Behal S, Bhattacharyya R, Banerjee D. An experience of staining of albumin esterase activity with various Fast dyes. Ind J ClinBiochem. 2018; 33, S36 (P36). <https://doi.org/10.1007/s12291-018-0795-1>.

6. **Kumar D**, Behal S,Bhattacharyya R, Banerjee D. Can Serum Albumin be a Predictor of the Pathogenesis of Tuberculosis. International Conference on Microbial Pathogenesis and New Frontiers 2019. Pg 38.

7. **Kumar D**. A tool for detection of urine contamination in water. 1st CRICK Chemistry Symposium (CCS 2019), IISER, Nov 2019.

8. **Kumar D**. Pseudoesterase activity of Albumin: A novel method for detection of microalbuminuria. Ind J ClinBiochem 2019; 34, S217 (P328). <https://doi.org/10.1007/s12291-019-00859-4>.

9. **Kumar D**, Bhattacharyya R, Banerjee D. Can inhalational formulation be planned forcontrolling COVID 19 pandemic?Influenza: Flu and Emerging Viral Respiratory Infections (Webinar). August 20-21, 2020.

10. **Kumar D**, Chowdhary S, Bhattacharyya R, Banerjee D. Undrstanding the effect of structural modification of albumin on its pseudoesterase activity: An in-silico study. 2nd International Health and Medical sciences Conference, September 18-19, 2021/ MUS TURKEY (virtual mode); pg 50.ISBN: 978-625-7720-63-2.

11. Sangwan S, Jain S, Kaur S, Chowdhary S, **Kumar D**, Bhattacharyya R, et al. Analysis of bisphenol A (BPA) through ultra-performance liquid chromatography. 2nd International Health and Medical sciences Conference, September 18-19, 2021/ MUS TURKEY (virtual mode);pg 12.ISBN: 978-625-7720-63-2.

12. Sehrawat S, Kumar R, Banerjee D, Bhattacharyya R, Chowdhary S, **Kumar D**. In-silicointeraction of heparin with RBC membrane proteome. 2nd International Health and Medical sciences Conference, September 18-19, 2021/ MUS TURKEY (virtual mode); pg 42. ISBN: 978-625-7720-63-2.

13. Kaur S, Jain S, Sangwan S, Chowdhary S, **Kumar D**, Bhattacharyya R, et al. BPA analogue, BPC detection analysis in drinking water through ultra-performance liquid chromatography. 2nd International Health and Medical sciences Conference, September 18-19, 2021/ MUS TURKEY (virtual mode); pg 59. ISBN: 978-625-7720-63-2.

14. Chowdhary S, **Kumar D**, Bhattacharyya R, Banerjee D. In-silico experience of screening of inhibitors for pseudoesterase activity of human serum albumin.2nd International Health and Medical sciences Conference, September 18-19, 2021/ MUS TURKEY (virtual mode); pg 45. ISBN: 978-625-7720-63-2.

15. Kumari M, **Kumar D**, Bhattacharyya R, Banerjee D. A Study of Interaction of Various Dyes with Human Serum Albumin and Globulins. Ind J Clin Biochem. 2021; 36, S59 (O-20). <https://doi.org/10.1007/s12291-021-01019-3>

16. Jain S, Kaur S, Sangwan S, Chowdhary S, **Kumar D**, Bhattacharyya R, Banerjee D. Effect of BPB on Bacterial Growth. Ind J Clin Biochem. 2021; 36, S84 (PP-40). <https://doi.org/10.1007/s12291-021-01019-3>

17. Singh S, Chowdhary S, Kumar D, Bhattacharyya R, Banerjee D. Screening of Oximolysis of Ester Substrate: A Step towards Finding of Ester Substrate for Erythrocyte Cholinesterase with Minimal Oximolysis. Ind J Clin Biochem. 2021; 36, S125 (PP-127). <https://doi.org/10.1007/s12291-021-01019-3>

18. Kumar D, Behal S, Bhattacharyya R, Banerjee D. Pseudoesterase Activity of Human Serum Albumin: A Promising Approach to Detect Microalbuminuria. Ind J Clin Biochem. 2021; 36, S159 (PP-201). <https://doi.org/10.1007/s12291-021-01019-3>

19. Surender, Kaur S, Kumar D, Chowdhary S, Bhattacharyya R, Kumar R, Banerjee D. Whether Anti-Coagulants Cause Hemolysis: A Question Relevant For Estimation of Biomolecules From Plasma Samples. Ind J Clin Biochem. 2021; 36, S160 (PP-204). <https://doi.org/10.1007/s12291-021-01019-3>

20. Yadav D, Chowdhary S, Kumar D, Bhattacharyya R, Banerjee D. In-Silico Studies Of Phosphine with Mitochondrial Complexes: A Step towards the Finding A Biomarker of Aluminum Phosphide Poisoning. Ind J Clin Biochem. 2021; 36, 1–169 (PP-40). <https://doi.org/10.1007/s12291-021-01019-3>

21. Chowdhary S, Kumar D, Kaur S, Bhattacharyya R, Banerjee D. Screening of Potential Inhibitors of Pseudoesterase Activity of Albumin: A Step towards Understanding Its Role in Cholesterol Modulation. Ind J Clin Biochem. 2021; 36, S48. <https://doi.org/10.1007/s12291-021-01019-3>

**Details of work done so far and significance of the scientific contribution**

The title of my PhD thesis is “Development of a novel strategy for rapid detection of human serum albumin pseudoesterase activity – A step towards a novel point of care screening for microalbuminuria”.

Microalbuminuria detection is a commonly performed parameter in a clinical biochemistry laboratory. Immunochemical methods are popular for such detection, but such methods lack sensitivity. It does not sense the immune unreactive albumin fragments excreted in the urine. Further, the dye-based methods of albumin detection are not specific for human serum albumin (HSA). It senses other proteins as well that are often excreted in the urine. It is in this context it was felt that novel strategies have to be innovated for microalbuminuria detection. It is known that HSA has a slow turnover esterase activity. It was hypothesized that exploring this unique property of HSA, a novel strategy of microalbuminuria can be developed. The study was divided in in-silico, in-vitro and in-clinical phase. It was observed that 2-Naphthyl acetate (2NA) behaves as a relevant substrate for HSA activity detection.

Further, it was observed that neostigmine does not inhibit pseudoesterse activity of HSA (<https://pubmed.ncbi.nlm.nih.gov/33379110/> (Kumar D, et al. Talanta 2021)). Based on the above inventions, a method was innovated for sensing albumin in human urine (<https://www.sciencedirect.com/science/article/abs/pii/S0003269721003031>). We believe that the innovations recorded here will pave the path of novel microalbuminuria detection system at the point of care in days to come.

Besides, I have also assessed the interference of the common anti-tubercular drugs in creatinine estimation. It was found that rifampicin and isoniazid (anti-tubercular drugs) behave as non-creatinine chromogens and can interfere with Jaffe’s reaction. The data obtained is available at <https://pubmed.ncbi.nlm.nih.gov/32553320/> (Kumar D, et al. Indian J Tuberc 2020).

Recently, I have published a hypothesis that vitamin D may prevent the COVID-19 disease by inducing the expression of ACE2 receptor (receptor responsible for SARS Cov-2 virus binding and entry into host) and/or by supressing renin activity (that may reduce the angiotensin II resulting in less pulmonary vasoconstriction).

Moreover, during my PhD tenure, I have developed a hypothesis that pseudoesterase activity of HSA may regulate the cholesterol biosynthesis and made it available at public domain (<https://pubmed.ncbi.nlm.nih.gov/29685194/> (Kumar D, et al. Med Hypotheses 2018)).

**References:**

* Dr. Dibyajyoti Banerjee, Professor

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I hereby declare that the information given above is true to the best of my knowledge.

Place: Chandigarh Deepak Kumar

Date: 30th April 2022