Sharif Mohammad Shaheen, PhD

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Nationality: Bangladeshi
Tel: +359888851198 (BG)

Work experience

Experienced Researcher, EU-Project POLINNOVA, **Institute of Polymer, Bulgarian Academy of Science, Sofia 1113, Bulgaria** (From September 5, 2013 to date).

Researcher (postdoctoral) at Faculty of pharmaceutical science, Hokkaido University, JAPAN: JSPS 20072009; JST CREST 2009-2010; And other grants to September 4, 2013.
Associate Professor: Department of Pharmacy, University of Rajshahi, Bangladesh (Jan 2005-Nov 2007)
Assistant Professor: Department of Pharmacy, University of Rajshahi, Bangladesh (Sept 1999-Dec 2004)
Lecturer: Department of Pharmacy, University of Rajshahi, Bangladesh (Sept 1996-Aug 1999).

Education

PhD: 2004 (Materials science and Engineering: Drug Delivery System), Shinshu University, JAPAN
Master of Engineering: 2001 Kansei Engineering, Shinshu University, JAPAN
Master of Pharmacy: 1994 University of Dhaka, Bangladesh
Bachelor of Pharmacy: 1991 University of Dhaka, Bangladesh

Selected Publications

1. Naoya Miura, **Sharif M. Shaheen**, Hidetaka Akita, Takashi Nakamura, Hideyoshi Harashima. A KALA-modified lipid nanoparticle containing CpG-free plasmid DNA as a potential DNA vaccine carrier for antigen presentation and as an immune-stimulative adjuvant. ***Nucleic Acids Res.*** 2015 Jan 20. pii: gkv008. [Epub ahead of print] (First three authors are contributed equally as joint first authors).
2. Hidetaka Akita, Soichiro Ishii, Naoya Miura, **Sharif M. Shaheen**, Yoshiro Hayashi, Takashi Nakamura and Hideyoshi Harashima, A DNA microarray-based analysis of immune-stimulatory and transcriptional responses of dendritic cells to KALA-modified nanoparticles, ***Biomaterials*** 34 (2013) 8979-8990. (Impact factor 8.31)
3. **Shaheen S**, Akita H., Souchirou I, Miura N, Harashima H, A potential non-viral vector to transfect Bone Marrow Derived Dendritic Cell (BMDC) and thereby MHC-Class I antigen presentation might be a potential use in DNA vaccine for carcinoma, ***Cancer Res***, 2012, *72;* P4-04-08. http://cancerres.aacrjournals.org/content/72/24_Supplement/P4-04-08.
4. **Sharif M Shaheen**, Hidetaka Akita, Atsushi Yamashita, Ryo Katoono, Nobuhiko Yui, Vasudevanpillai Biju, Mitsuru Ishikawa, and Hideyoshi Harashima, Quantitative analysis of condensation/decondensation status of pDNA in the nuclear subdomains by QD-FRET, ***Nucleic Acid Research*** 2011;39(7):e48. [Impact factor 8.8]
5. **Sharif M Shaheen,** Hidetaka Akita, Takashi Nakamura, Shota Takayama, Shiroh Futaki , Atsushi Yamashita, Ryo Katoono , Nobuhiko Yui and Hideyoshi Harashima, KALA-modified multi-layered nanoparticles as gene carriers for MHC Class-I mediated antigen presentation for a DNA vaccine, ***Biomaterials*** 2011;32(26):6342-50. [Impact factor: 8.31]
6. **Patent**: Harashima, H., Hidetaka, A., Shaheen, S.M., Nakamura, T., Ishii, S., Futaki, S. (2013) US 20130122054 A1, CN103037840A, EP2572706A1, EP2572706A4, WO2011132713A1, Lipid membrane structure having intranuclear migrating property.
7. **Sharif M Shaheen**, Hidetaka Akita, Atsushi Yamashita, Ryo Katoono, Nobuhiko Yui, Vasudevanpillai Biju, Mitsuru Ishikawa, and Hideyoshi Harashima, A novel technique to quantify condensation/decondensation status in the nuclear sub-domains by QD-FRET, ***Cancer Res*** 2009; 69(23 Suppl):C66. http://cancerres.aacrjournals.org/content/69/23_Supplement/C66
8. **S. M. Shaheen**, and K. Yamaura, Preparation of theophylline hydrogels of atactic poly(vinyl alcohol)/NaCl/H_2O system for drug delivery system, ***J. Controlled Release***, **81** (2002) 367-377. [Impact factor 7.23]

9. **S. M. Shaheen**, K. Ukai, L.-X. Dai and K. Yamaura, Properties of hydrogels of atactic poly (vinyl alcohol)/NaCl/H_2O system and their application to drug release, ***Polymer International***, **51** (12): 1390-1397 (2002). [Impact Factor: 2.137]
10. **S. M. Shaheen**, and K. Yamaura, Mass Transfer from Theophylline Hydrogels of *a*-PVA/H_2O and *a*-PVA/NaCl/H_2O System on Heating, ***Polym. Adv. Tech.,*** **14**, 686-693 (2003). [Impact factor 1.532]
11. **S. M. Shaheen**, K. Takezoe and K. Yamaura, Effect of Binder Additives on Terbutaline Hydrogels of *a*-PVA/NaCl/H_2O system in Drug Delivery: I. Effect of Gelatin and Soluble Starch*,* ***Bio-medical Mater. and Eng***. **14** (4): 371-382 (2004).
12. L.-X. Dai, K. Ukai, **S. M. Shaheen** and K. Yamaura, Gelation of New Hydrogel System of *atactic*-Polyvinyl Alcohol/NaCl/H_2O, ***Polymer International***, **51**: 715 (2002).

Other publications

Pharmaceutics (Drug Delivery System)

12. **Sharif M. Shaheen**, Lubna Jahan, Rahat Ferdaus; A therapeutic TDS patch of Metformin from a HPMC-PVA Blend studied with a biological membrane of highly tight net-work, swim bladder to ensure a promising dermal application in NIDDM (in press).
13. **S.M. Shaheen**, Release Kinetics Study of Theophylline from Egg Albumin Matrix Tablets, *Graduate thesis (M. Pharm.)*, Dhaka University, 1994.
14. **S.M. Shaheen**, M. Rashid, R. Jalil and M.A. Islam. Effect of egg albumin concentration on the release kinetics of theophylline from egg albumin matrix tablets. *Journal of Bio-Science*, 4, 129-139, 1996.
15. M. Rashid, **S. M. Shaheen**, R. Jalil and M. A. Islam, Effect of Lactose on the Release of Salbutamol Sulfate from Hydrophobic Matrices, *J. Bio-sci*., 4: 143-149, 1996.
16. M. Rashid, **S. M. Shaheen**, R. Jalil and M. A. Islam, Release Kinetics of Salbutamol Sulfate from HPMC Based Sustained Release Matrix: I Effect of Cetyl Alcohol and Bees Wax, *Pakistan Journal of Pharmacol*.15 (2), July 1998, pp. 57-63.
17. M. Ahmed, R. Jalil, M. A. Islam and **S. M. Shaheen**, Release Kinetics of Diclofenac Sodium from Preparatory Glycerol Mono stearate Suppositories, *Rajshahi University Studies,* 26 Part-B, 27-39 (1998).
18. A. K. M. M. Hossain, R. Jalil. M. A. Islam and **S. M. Shaheen**, Effect of polymeric additives on the Release Kinetics of Ibuprofen from their Matrix Tablets, *Rajshahi University Studies,* 27 Part-B, 35-39 (1999).
19. M. Ahmed, R. Jalil, M. A. Islam and **S. M. Shaheen**, Preparation and Stability Study of Diclofenac Sodium Suppositories, *Pakistan Journal of Biological Sciences*, 3(10): 1755-1757, 2000. http://ansijournals.com/pjbs/2000/1755-1757.pdf
20. **S. M. Shaheen**, Kinetic Study of Theophylline Release from Atactic Poly vinyl alcohol Hydrogel Matrices, *Graduate Thesis (Master of Engineering)*, Shinshu University, 2001.
21. **S. M. Shaheen**, Studies on a Delivery System of Anti-asthmatic Drugs from a Novel Hydrogels of *atactic* Poly(vinyl alcohol)/NaCl/H_2O System, Ph.D. *Thesis*, Shinshu University, Japan (2004).
22. **S. M. Shaheen**, M. Rashid, R. Jalil and M. A. Islam, 'Heating and Chemical Denaturation of egg albumin matrix and its effect on the release kinetics of theophylline from tablets' *Pak. J. Biol. Sci.*, 7(9): 1488-1492 (2004). http://ansijournals.com/pjbs/2004/14881492.pdf
23. **S. M. Shaheen**, M. A. K. Molla, M. Ahmed and A. K. M. M. Hossain, Application of a few waxy materials on the release of naproxen from polyethylene glycol based suppositories, *Pak. J. Biol. Sci.* 8(12): 1685-1689 (2005). http://ansijournals.com/pjbs/2005/1685-1689.pdf
24. M. A. K. Molla, **S. M. Shaheen**, M. Rashid, M. Ahmed and A. K. M. M. Hossain, Rate controlled release of naproxen from HPMC based sustained release dosage form: I. Microcapsule compressed tablet and matrices, *D.U. J. Pharm.. Sci.*4(1): 15-21 (2005).
25. M. Belal Hossain, M. Rashid, M. Ahmed, **S. M. Shaheen** and A. K. M. Motahar Hossain, Release kinetics studies of Ibuprofen from sustained release microcapsules, , *D.U. J. Pharm.. Sci.*4(1): 45-49 (2005).

26. **S. M. Shaheen**, and Kazuo Yamaura, In-vitro parameters evaluation of theophylline release from the hydrogels of atactic poly(vinyl alcohol)/NaCl/H_2O system, *Int. J. Pharmacol.* 2(3): 286-292, 2006. Link to article: http://ansijournals.com/ijp/2006/286-292.pdf **26.** Sharif Mohammad Shaheen, Md. Nazir Hossen, Kazi Mehedul Islam, Maruf Ahmed, Md. Shah Amran, and Mamunur Rashid,
Effect of Bio-adhesive Polymers like HPMC, Gelatin, Na-CMC and Xanthan Gum on Theophylline Release from Respective Tablets, *Int. J. Pharmacol.* 2(5): 504-508, 2006; http://ansijournals.com/ijp/2006/504-508.pdf
27. M. I. Islam, **S. M. Shaheen**, M. A. Basher, and Mamunur Rashid Preparation of Egg Albumen based salbutamol (EA) microspheres: III. Effect of the stirring speed on the release kinetics of salbutamol sulfate microspheres *J. Bio-Sci.,* 13: 27-31, 2005.
28. Md. Kamrul Hasan , Md. Ajijur Rahman, **Sharif Mohammad Shaheen**, and Md. Anwar Ul Islam. *In-Vitro* and *In-Vivo* Evaluation of a Rosiglitazone Maleate-loaded HPMC-PVA Blend Patch. *Bangladesh Pharmaceutical Journal.* 13 (2) 60-63 (2010).

29. Jahan, L.; Ferdaus, R.; **Shaheen, S. M**.; Sultan, M. Z.; Mazid, M. A. In vitro Transdermal Delivery of Metformin from a HPMC/ PVA Based TDS-patch at Different pH, Journal of Scientific Research; 2011, Vol. 3 Issue 3, p651. http://connection.ebscohost.com/c/articles/65483034/vitro-transdermal-delivery-metformin-from-hpmc-pva-based-tds-patchdifferent p^H.

Pharmaceutical Chemistry

31. **Shaheen S.M**., Huq M.R., Khan M.S. and Gafur M. A., Accelerated Stability study of Gentamicin Sulphate injection. TAJ, *Teachers Association Journal, Rajshahi Medical College*, 13(2),110-113 (2000).
32. Md.Shah Amran, Maruf Ahmed, S. M. Shaheen, Sheikh Niaz Morshed, Md. Jahangir Alam Khandakar, Md. Masudur Rahman, Md. Mosiur Rahman, Md. Amjad Hossain, Short Communication: A study on the packaging information of essential drug products used at union and thana health complex level in Bangladesh *Pak J. Pharm. Sci.* 2007, Vol.20(4), 327-332.
33. **S. M. Shaheen**, Accelerated Stability Study of Metronidazole infusion 100 ml, *TAJ* 18(2): 118-121 (2005).
34. Most. Afia Akhtar, Mamunur Rashid, Mir Imam Ibne Wahed, Md. Robiul Islam, **Sharif Mohammad Shaheen**, Md. Ariful Islam, Md. Shah Amran and Maruf Ahmed, Comparison of Long-term Antihyperglycemic and Hypolipidemic Effects Between *Coccinia cordifolia* (Linn.) And *Catharanthus roseus* (Linn.) in Alloxan-induced Diabetic Rats*, Research Journal of Medicine and Medical Sciences*, 2(1): 29-34, 2007
35. M. A. Islam, M. Afia Akhtar, M. R. I. Khan, M. S. Hossain, M. K. Alam, M. I. I. Wahed, B. M. Rahman, A. S. M. Anisuzzaman, **S. M. Shaheen**, and Maruf Ahmed; Antidiabetic and Hypolipidemic Effects of Different Fractions of *Catharanthus Roseus* (Linn.) on Normal and Streptozotocin-induced Diabetic Rats, *J. Sci. Res.* 1 (2), 334-344 (2009). http://www.banglajol.info/index.php/JSR
36. M. R. I. Khan, M. A. Islam, M. S. Hossain, M. Asadujjaman, M. I. I. Wahed, B. M. Rahman, A. S. M. Anisuzzaman, **S. M. Shaheen**, M. Ahmed; Antidiabetic Effects of the Different Fractions of Ethanolic Extracts of *Ocimum sanctum* in Normal and Alloxan Induced Diabetic Rats, *J. Sci. Res*. **2** (1), 158-168 (2010)
37. Md. Ariful islam, Md. **Rafiqul islam** khan, Md. **Sarwar hossain**, **AHM khurshid** Alam, Mir Imam Ibne Wahed, Bytul M Rahman, ASM anisuzzaman, Sharif M Shaheen, Maruf Ahmed. Antidiabetic and hypolipidemic effects of different fractions of coccinia cordifolia l.on normal and streptozotocin-induced diabetic rats", *Pak J Pharm Sci.* 2011;24(3):331-8.

Review articles

38. **S. M. Shaheen**, Md. Nazir Hossen, Maruf Ahmed, Md. Shah Amran Green tea in health care sector: a natural medicine, a natural drink, *J. Appl. Sci. Res.* 2(6): 306-309, 2006. **http://www.insinet.net/jasr/2006/306-309.pdf**
39. **S. M. Shaheen,** F. R. Shakil Ahmed, Md. Nazir Hossen, Maruf Ahmed, Md. Shah Amran and Md. Anwar-Ul-Islam, Liposome as a carrier for advanced drug delivery, *Pak. J. Biol. Sci.*9(6): 1181-1191, 2006.

ABSTRACT IN SCIENTIFIC SYMPOSIA/CONFERENCE

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1. Sharif M. Shaheen, Pavel Bakardzhiev, Denitsa Momekova, Neli S. Koseva, and Stanislav Rangelov Preparation of local anti-wart and anti-inflammatory rub of polyglycidol based saturated lipid (DDP-PG) with HPMC containing curcumin, AACR (American Association for Cancer Research) special conference on Tumor Immunology and Immunotherapy: A New Chapter, Orlando, Fl. 2014.

2. Sharif M. Shaheen, Akita Hidetaka and Hideyoshi Harashima, A Lys-Ala-Leu-Ala (KALA) repeated peptide modification in DNA nanoparticles of DOPE/CHEMS, follows GPCR mediated transgene expression in dendritic cell, American Association for Cancer Research, (AACR) special conference on Pancreatic Cancer Innovations in Research and Treatment, Hyatt Regencey New Orleans, LA. 2014.
3. Sharif M. Shaheen, Akita Hidetaka and Hideyoshi Harashima, Better transgene expression from a proteoplex than that of polyplex in murine derived dendritic cell, European Symposium on controlled drug delivery (ESCDD), The Netherland, 2014.
4. Sharif M. Shaheen, Akita Hidetaka and Hideyoshi Harashima, Comparatively Higher Transgene Expression By Post Modification of KALA Peptide with DOPE/Cardiolipin Lipid Based DNA-protamine Nanoparticles in Bone Marrow Derived Dendritic Cell (BMDC), European Symposium on controlled drug delivery (ESCDD), The Netherland, 2014.
5. Sharif M Shaheen, Hidetaka Akita, Takashi Nakamura, Shota Takayama, Shiroh Futaki , Atsushi Yamashita, Ryo Katoono , Nobuhiko Yui and Hideyoshi Harashima, MHC Class-I mediated antigen presentation by a non-viral T-MEND vector expressing a high luciferase activity in murine derived dendritic cells (JAWS-II), *Molecular Therapy*, vol 18, supplement 1, 2010: (401) S155, ASGCT, Washington DC.
6. Sharif M Shaheen, Hidetaka Akita, Atsushi Yamashita, Ryo Katoono, Nobuhiko Yui, Vasudevanpillai Biju, Mitsuru Ishikawa, and Hideyoshi Harashima; A novel technique to quantify condensation/decondensation status in the nuclear sub-domains by QD-FRET, *Drug Delivery System*, 24 (3) 2009.
7. Sharif M. Shaheen, Kazuma Takezoe and Kazuo Yamaura, Effect of Binder Additives on Terbutaline Hydrogels of aPVA/NaCl/H_2O System in Drug Delivery: I. Effect of Gelatin and Soluble Starch, *2nd International Conference of New Biomedical Materials*, Cardiff, Wales, United Kingdom (2003).
8. Kazuo Yamaura, and Sharif M. Shaheen, Preparation of theophylline hydrogels of atactic poly(vinyl alcohol)/NaCl/H_2O system for drug delivery system, *2nd International Conference of New Biomedical Materials*, Cardiff, Wales, United Kingdom (2003). (**Invited Speaker**)
9. S. M. Shaheen and K. Yamaura, Preparation of Cost Effective Hydrogels for Theophylline Release Kinetics, *29th Annual Meeting of Controlled Release Society in Collaboration with Korean Society for Biomaterials*, Seoul, South Korea, vol.**1**: 223 (2002).
10. S. M. Shaheen and K. Yamaura,Studies on the Drug Delivery from the Hydrogels of atactic-PVA/NaCl/H_2O System, *2nd International Conference on Advanced Fiber/Textile Materials*, Ueda, Nagano, Japan, November 10-12, 108 (2002).
11. S. M. Shaheen and K. Yamaura, Theophylline Release from the Hydrogel of *atactic* Polyvinyl Alcohol/NaCl/H_2O System, SPSJ 5oth Symposium on Macromolecules, *Polymer Preprint,* Japan, vol. **50**, No. 2, E 1099 (2001).
12. S. M. Shaheen and K. Yamaura, Preparation of Theophylline Hydrogel of *a*-PVA/NaCl/H_2O System and its Properties: II. Thermal Properties and Drug Release Behavior, *Fiber Preprints*, Japan, vol. **56**, No. 3, 64 (2001).
13. S. M. Shaheen and K. Yamaura, In-vitro Correlations of Theophylline Release from the Hydrogels of atactic Poly (vinyl alcohol)/NaCl/Water System: Effect of Agitators, Rotation Speeds and Release Medium, *Polymer preprints*, Japan, vol. **51**, No. 5, 1019 (2002).
14. S. M. Shaheen, M. Iwaseya, M. Takahashi and K. Yamaura, Temperature Dependent Phase-Transition of *atactic* Poly(vinyl Alcohol)/NaCl/Water System, *Polymer preprints*, Japan, vol. **52**, No. 3, 675 (2003).
15. S. M. Shaheen and K. Yamaura, Application of *atactic* Poly(vinyl Alcohol)/NaCl/Water Hydrogel System in Nature, 34th annual meeting of UCRS in Chubu Area, Japan, 2003, 135.

****Number of citations according to google scholar in total till January, 2015: 289**

Manuscripts under preparation:

1. A Lys-Ala-Leu-Ala (KALA) repeated peptide modification in DNA nanoparticles of DOPE/CHEMS, follows GPCR mediated transgene expression in dendritic cell (submitted)
2. A post modification of repeated Lys-Ala-Leu-Ala peptide with DOPE/Cardiolipin lipid based DNA-Protamine nanoparticles prefers high transgene expression in bone marrow derived dendritic cells (BMDC) (Under submission).
3. Equations to predict nuclear localization signal (NLS) peptides based on the hydropathy index ratio (The manuscript ready to submit to the Journal of computational biology)
4. Protaplex prefers prompt transgene expression to that of the rotaplex in BMDC (to be submitted)
5. Lipoplex of lipofectamin-plus and CpG free vector-GL3 shows the supreme gene expression in BMDC and Curcumin a CBP/p-300 inhibitor shutdowns its total expression (to be submitted)

Research field of interest: Bioengineering based on Molecular Pharmaceutics and Genetics, Drug Delivery System, Tissue Engineering using Hydrogel Scaffolds, Peptid/Protein/ Gene delivery, siRNA, shRNA delivery, DNA vaccination, Nanomedicines for molecular future therapy: Immunotherapy, Cancer prevention and other genetic disease management.

Summary of current research

My present research

I am at present a researcher at the Institute of Polymer, Bulgarian Academy of Sciences, Sofia, committed to introduce intelligent and smart polymer based non-viral vector to deliver small as well as macromolecules, targeting the cancer cell so that a promising molecular ligand based cancer therapy might be possible. I am also committed to develop non-viral vector to inaugurate smart polymer based vaccine for cancer immunotherapy and vaccination thereby, targeting the immune cell.

At present stage I am now in the synthesis of a few polyglycidol and lipid based block copolymers in order to replace the PEG (Polyethylene glycol) unit. Because PEG has got the dilemma problem of its length: high molecular weight contributes the liposomal cargoes long circulation time in blood but low cellular uptake and low molecular weight PEG shows that the high cellular uptake but very short circulation time in blood. (Ref. Hatakeyama et al. *Adv Drug Deliv Rev*. 2011 Mar 18;63(3):152-60 and *Biol Pharm Bull.* 2013;36(6):892-9; Liu T, Thierry B., *Langmuir*. 2012 Nov 6;28(44):15634-42; Löser C. *Z Gastroenterol*. 2013 May;51(5):444-9).

After the successful synthesis of the polymers I have plan to prepare liposomal DNA-polymers cargoes as well as liposomal anticancer drugs (natural polyphenolic compounds type like Epigallocatechin gallate, Proanthocyanidins, capsaicin, curcumin and so on) to be targeted to the tumor microenvironment, depending on the type of ligands conjugated with the polymers synthesized here. I have also plan to construct plasmid DNA containing E-caderin gene to be delivered to the cancer cell for E-caderin *in-situ* gene therapy. Reversely siRNA delivery to the cancer cell for silencing the mRNA of TGF-beta as target silencing. Because it was reported that excess expression of TGF beta caused uncontrolled EMT for tumor metastasis (reference Oncogene. 2010; 29(49):6485-98; Cancer Lett. 2010; 291(1):59-66.).

Supervised group members

Name	Position	From (mo/yr)	to	(mo/yr)
Md. Nazir Hossen (M. Pharm. Thesis)	M. Pharm.	Jan 2004		Jan 2006
Lubna Jahan (M. Pharm. Thesis)	M. Pharm.	Jan 2005		Nov 2007

Rahat ferdaus (Project Thesis)	M. Pharm	Jan 2005		Nov 2007
Kamrul Hasan (M. Pharm. Thesis)	M. Pharm	Jan 2007		Nov 2007

Funding as PI

No.	Type of funding	Total amount (USD or eq)	From (mo/yr)	to	(mo/yr)
1	Grant no. 2001/714 (2006-2007) BCSIR, Bangladesh.		June 2006		July 2007

Technical skills:

Development of non-viral vector of nanoparticles named MEND (multifunctional envelope type of nanodevice) containing DNA and siRNA, Liposomes containing small molecular drug, Block copolymer synthesis and lipopeptide modification for new nonviral vector production, Hydrogel preparation, microgel/nanogel/cryogel, Protein/plasmid DNA isolation and purification, Peptide (fmoc) synthesis and peptide-lipid conjugation, protein-protein interaction and characterization, Plasmid DNA construction, HPLC, MALDI-TOF Mass spectroscopy, NMR, UV-Visible spectral analysis, Confocal microscopy LSM META 510, Nikon A1 confocal microcopy, Olympus Fluoview FV1Oi confocal microscopy, Confocal Image assisted three dimensional quantification (CIDIQ), Cell culture of endothelial, cancer cell and immune cells, Antigen presentation (Both MHC Class-I and Class-II using B3Z and OTIIZ T-Cell Hybridoma), BMDC (Bone Marrow Derived Dendritic Cell) generation, Anti-tumor activity in animal model, ELISA for cytokines studies, In vitro and in vivo CTL assay, Electrophoresis (SDS-PAGE, Agarose, Tris-glycine, Urea-glycerol PAGE), RT-PCR, FACS studies, Western blotting, Southern blotting, Immuno-precipitation and Statistical analysis (One way ANOVA, Two way ANOVA, Multiple comparison test, survival Bayesian analysis).

Research Grant awarded:

Grant no. 2001/714 (2006-2007) awarded by BCSIR (Bangladesh Council of Scientific and Industrial Research).

AWARDS AND ACHIEVEMENTS

(i) Dhaka Board Scholarship at S. S. C. and H. S. C. level.

(ii) Dhaka University Scholarship at Graduate and Postgraduate level.

(iii) Awarded Japanese Government Scholarship (MONBUKAGAKUSHO) from October 1998 to March 2004 for research leading to Ph.D. Degree in Japan.

(iv) Awarded JAPAN SOCIETY OF PROMOTION FOR SCIENCE (JSPS) from November 2007 to November 2009.

(v) Awarded Postdoctoral fellowship (JST CREST) from the Dec. 1 to March 31, 2010, Faculty of Pharmaceutical Science, Hokkaido University, Japan

(v) Awarded Postdoctoral fellowship from the April. 1 to March 31, 2011, Faculty of Pharmaceutical Science, Hokkaido University, Japan

(vi) Awarded Postdoctoral fellowship from the April. 1 to March 31, 2012, Faculty of Pharmaceutical Science, Hokkaido University, Japan

(vii) Awarded Postdoctoral fellowship from the April. 1 to March 31, 2013, Faculty of Pharmaceutical Science, Hokkaido University, Japan

Training Obtained

i) One month in-plant training as the partial fulfillment of Bachelor of Pharmacy course under Dhaka University in collaboration with ICI pharmaceuticals Ltd ii) Two days training course on Clinical Trial Phase-I, Phase-II, Phase-III and Phase-IV organized by American Society of Gene and Cell Therapy, held in Washington DC 2010.

Membership of Professional Bodies

(i) Registered Pharmacist of Pharmacy Council of Bangladesh. Active member of Bangladesh Pharmaceutical Society (BPS)
(ii) Pharmacy Graduates' Association (PGA) and Rajshahi University Teachers' Association (RUTA)
(iii) Associate member of American Society of Gene Therapy (ASGT), 16175
(iv) Member of Japan Society of Drug Delivery System (DDS) 0906005
(v) Associate member of AMERICAN ASSOCIATION FOR CANCER RESEARCH (AACR), 227014

Language Proficiency: English (speaking, writing, reading), Bengali (speaking, writing, reading), Japanese (speaking), French (elementary). IELTS, TOEFL, TOEIC

Five best publication:

Publication 1.

Naoya Miura, **Sharif M. Shaheen**, Hidetaka Akita, Takashi Nakamura, Hideyoshi Harashima. A KALA-modified lipid nanoparticle containing CpG-free plasmid DNA as a potential DNA vaccine carrier for antigen presentation and as an immune-stimulative adjuvant. ***Nucleic Acids Res***. 2015 Jan 20. pii: gkv008. [Epub ahead of print] (First three authors are contributed equally as joint first authors)

Reasons for choosing the article
I have introduced here a potential non-viral vector named KALA-MEND for the development of DNA vaccine. It was very important to deliver genetic material to the immune cell like dendritic cell to immunize.

Abstract

Technologies that delivery antigen-encoded plasmid DNA (pDNA) to antigen presenting cell and their immune-activation are required for the success of DNA vaccines. Here we report on an artificial nanoparticle that can achieve these; a multifunctional envelope-type nanodevice modified with KALA, a peptide that forms α-helical structure at physiological pH (KALA-MEND). KALA modification and the removal of the CpG-motifs from the pDNA synergistically boosted transfection efficacy. In parallel, transfection with the KALA-MEND enhances the production of multiple cytokines and chemokines and co-stimulatory molecules via the Toll-like receptor 9-independent manner. Endosome-fusogenic lipid envelops and a long length of pDNA are essential for this immune stimulation. Furthermore, cytoplasmic dsDNA sensors that are related to the STING/TBK1 pathway and inflammasome are involved in IFN-β and IL-1β production, respectively. Consequently, the robust induction of antigen-specific cytotoxic T-lymphoma activity and the resulting prophylactic and therapeutic anti-tumor effect was observed in mice that had been immunized with bone marrow-derived dendritic cells ex vivo transfected with antigen-encoding pDNA. Collectively, the KALA-MEND possesses dual functions; gene transfection system and immune-stimulative adjuvant, those are both necessary for the successful DNA vaccine.

Publication 2

Sharif M Shaheen, Hidetaka Akita, Atsushi Yamashita, Ryo Katoono, Nobuhiko Yui, Vasudevanpillai Biju, Mitsuru Ishikawa, and Hideyoshi Harashima, Quantitative analysis of condensation/decondensation status of pDNA in the nuclear sub-domains by QD-FRET, ***Nucleic Acid Research*** 2011;39(7):e48. [Impact factor 8.8]

Reason for choosing this paper

Here I have introduced a nanodevice that enables to deliver gene to the nuclear subdomain of the cancer cell and I visualized the plasmid DNA as condensed and decondensed form in nuclear subdomain region. In such way, future gene delivery to the cancer cell with this promising vector might be possible promisingly.

Abstract

Recent studies indicate that controlling the nuclear decondensation and intra-nuclear localization of plasmid DNA (pDNA) would result in an increased transfection efficiency. In the present study, we established a technology for imaging the nuclear condensation/decondensation status of pDNA in nuclear subdomains using fluorescence resonance energy transfer (FRET) between quantum dot (QD)-labeled pDNA as donor, and rhodamine-labeled polycations as acceptor. The FRET-occurring pDNA/polycation particle was encapsulated in a nuclear delivery system; a tetra-lamellar multifunctional envelope-type nano device (T-MEND), designed to overcome the endosomal membrane and nuclear membrane via step-wise fusion. Nuclear subdomains (i.e. heterochromatin and euchromatin) were distinguished by Hoechst33342 staining. Thereafter, Z-series of confocal images were captured by confocal laser scanning microscopy. pDNA in condensation/decondensation status in heterochromatin or euchromatin were quantified based on the pixel area of the signals derived from the QD and rhodamine. The results obtained indicate that modulation of the supra-molecular structure of polyrotaxane (DMAE-ss-PRX), a condenser that is cleaved in a reductive environment, conferred euchromatin-preferred decondensation. This represents the first demonstration of the successful control of condensation/decondensation in specific nuclear sub-domain via the use of an artificial DNA condenser.

Publication 3.

Sharif M Shaheen, Hidetaka Akita, Takashi Nakamura, Shota Takayama, Shiroh Futaki , Atsushi Yamashita, Ryo Katoono , Nobuhiko Yui and Hideyoshi Harashima, KALA-modified multi-layered nanoparticles as gene carriers for MHC Class-I mediated antigen presentation for a DNA vaccine, *Biomaterials* 2011;32(26):6342-50. [Impact factor: 8.31]

Reasons for choosing

In this article I have used the previously published nano device and delivered gene to the non-dividing cell like dendritic cell so that we can produce a promising DNA vaccine carrier, delivering the gene of interest. Here we have shown the modification with a repeated lys-ala-leu-ala peptide with T-MEND can deliver the gene to a non-diving cell like dendritic cell. Usually this kind of cells are very difficult to deliver the gene.

Abstract

DNA vaccines are a new-generation vaccines that elicit an immunological response against a wide-variety of antigens with frequent mutations. However, an effective non-viral vector for genetically engineered DNA to dendritic cells is yet to be developed. We previously reported that an octa-arginine (R8)-modified tetra-lamellar multi-functional envelope-type nano device (R8-T-MEND) increases transfection efficiency in dendritic cell cultures (JAWS II). The critical structural elements of the R8-T-MEND are a DNA-polycation condensed core coated with two nuclear membrane-fusogenic inner envelopes, and two endosome-fusogenic outer envelopes. While the gene expression was drastically enhanced by R8-T-MEND, antigen presentation using an epitope-encoding plasmid DNA remains an obstacle for future non-viral vectors in DNA vaccinations. In the present study, we upgraded the function of R8-T-MEND by improving the membrane-fusion processes with endosome- and nuclear membranes by incorporating the KALA peptide, and by reducing the charge ratio (+/-), in an attempt to accelerate intra-nuclear decondensation. The resulting KALA-modified T-MEND (R8/KALA-T-MEND) showed an approximately 20-fold higher transgene expression compared with the conventional R8-T-MEND in JAWS II, and exceeded that of Lipofectamine PLUS, a commercially available transfection reagent. Furthermore, significant antigen presentation of a specific epitope (SIINFEKL) was observed for the R8/KALA-T-MEND but was not detected for the conventional T-MEND or Lipofectamine PLUS when an ovalbumin (OVA)-encoding plasmid DNA was transfected. It thus appears that the R8/KALA-T-MEND has the potential for use as a vector in DNA vaccinations.

Publication 4.

Hidetaka Akita, Soichiro Ishii, Naoya Miura, Sharif M. Shaheen, Yoshiro Hayashi, Takashi Nakamura and Hideyoshi Harashima, A DNA microarray-based analysis of immune-stimulatory and transcriptional responses of dendritic cells to KALA-modified nanoparticles, *Biomaterials* 34 (2013) 8979-8990.

Reasons for choosing

In this article we have shown that a lys-ala-leu-ala peptide modification in DNA nano particles triggers cytokine stimulation, which caused the adjuvant properties of the vaccine and thereby gene expression too. We here especially a DNA micro array based analysis were performed to investigate the immune stimulatory and transcriptional responses to the nano device.

Abstract

Technologies for the transfection of antigen-encoding genes into the dendritic cells, and subsequent immune-activation are both prerequisites for a successful DNA vaccine. We herein report on the density-dependent enhancement of transgene expression by the simple modification by stearyl-conjugated KALA, an α-helical peptide (STR-KALA), onto a lipid envelope-type nanoparticle (the R8-MEND, an octaarginine-modified multifunctional envelope-type nano device). The enhanced transgene expression in the KALA-modified R8-MEND (R8/KALA-MEND) cannot be explained by cellular uptake and nuclear delivery efficacy. Thus, the post-nuclear delivery process (i.e. transcription), but not intracellular trafficking processes attributed the enhanced transfection efficacy. Microarray analyses revealed that transfection with the R8/KALA-MEND resulted in a greater perturbation in host genes expression in comparison with the R8-MEND and that this effect was time-dependent. Further pathway analyses in the category of transcription-related genes and a gene ontology analysis indicated that the R8/KALA-MEND stimulated the expression of transcription factors that are closely related to immune-activation (i.e. NF-kB and STAT). Inhibition of the transfection efficacy by blockage of the STAT pathways revealed that the enhanced transcription activity is the result of immune-stimulation. Collectively, the R8/KALA-MEND mounts a "switch-on" function that triggers signal transduction forward to the immune-stimulation analogous to an adjuvant, and consequently elicits active transcription.

Publication 5.

S. M. Shaheen, and K. Yamaura, Preparation of theophylline hydrogels of atactic poly(vinyl alcohol)/NaCl/H_2O system for drug delivery system, *J. Controlled Release*, 81 (2002) 367-377. [Impact factor 7.23]

Reasons for choosing

In this article I have prepared a cost effective drug delivery device of small molecules using polyvinyl alcohol, a food salt NaCl in aqueous system, making hydrogel of physical cross-linking methods. So that such hydrogel can be orally taken for the future small molecular drug delivery.

Abstract

Theophylline (TH) was loaded in a-PVA/NaCl/H2O hydrogels system by one cycle gelation only at -20 degrees C. However, it developed some unwanted crystal-like structure surrounding the hydrogels while kept at room temperature. The physical, chemical and thermal analyses of this crystal-like structure indicated TH embedded with thin hydrogels of a-PVA/NaCl. Later during dissolving of feed-mixture at least 3 h heat treatment with proper mixing at high temperature contributed hydrogels of almost no crystal-like structure. 3% of TH was successfully loaded by this way. This type of hydrogels showed Fickian type drug release

(Higuchi Model) and it showed a more sustained effect than that of traditional cyclic FT. Comparatively lower release rate, diffusion coefficient and kinetic constant values of this system prevail over other systems studied here. A DSC thermogram revealed that apparently homogeneous microgel junctions might play the key role behind the above properties. Moreover the a-PVA/TH/NaCl/H2O system depresses the freezing point at -30 degrees C instead of above this temperature. The hydrogels of this system were also prepared by freezing at -30 degrees C for 16 h as one cycle. Three cycles were done in cyclic FT (freezing at -30 degrees C for 16 h and thawing at room temperature for 8 h). Drug release was studied for a total of 750 min. Up to the asymptotic value, 10.5 h TH release from the hydrogel matrices of the a-PVA/NaCl/H2O system (gelation at -20 degrees C) and 6.5 h from those of a-PVA/NaCl/H2O (freezing at -30 degrees C) and a-PVA/H2O systems (cyclic FT) were found.

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