Sagar Lab

Engineering next-generation regenerative medicines

Dr. NITIN SAGAR obtained his PhD from Indian Institute of Technology Bombay in Biomedical Engineering and joined Stem Cell Research Centre (SCRC), Department of Hematology at Sanjay Gandhi Postgraduate Institute of Medical Sciences (SGPGIMS), Lucknowas Assistant Professor in 2023.

The Sagar Lab is a part of Stem Cell Research Centre (SCRC) and the Department of Hematology at the SGPGIMS. Our goal is to develop translatable guided tissue regeneration/engineering to address unmet clinical needs.

Working at the interface of biomaterials, material science, tissue engineering and medicine, our highly interdisciplinary research focuses on solving medical problems across a wide range of bone, ligament, tendon, dental, maxillofacial, nerve, liver, and skin repair/reconstruction.

Lab Values

The ambience at the Sagar Lab is firmlyinherent in the biomedical innovation that flow from individual knack along with collaborative cogency. We prefer the Commissioning of freedom and duty to our members.We believe on the recurrent learning that deliver commendable quality research for biomedical and tissue engineered innovations for clinical application.

Research Interests

- Development, physicochemical evaluation and scale-up of biomaterials disseminating the principles of Repair, Replacement and Regeneration.
- Preparation and modification of natural and synthetic polymers to hone anabolic tissue growth.
- Cellular and biological (*in-vitro*) evaluation of biomaterials using stem cells and Advanced Tissue Engineering.
- Pre-clinical (in vivo) and clinical evaluation of biomaterials.
- Regenerative devices and medicines for Biomedical Applications.

Current Position

Assistant Professor
Stem Cell Research Centre
Department of Hematology
Sanjay Gandhi Postgraduate Institute of Medical Sciences,
Lucknow - 226014, UP, India

Education

Doctor of Philosophy (Ph.D.)

Department of Biosciences and Bioengineering (Biomedical Engineering)

Indian Institute of Technology Bombay, India.

Masters in Biotechnology (Rank-1)

Department of Biotechnology and Microbiology

Gujarat University, Ahmedabad, India.

Professional Experience

- Teaching Assistant for 'Medical Physiology' and 'Biomaterials' course at IIT Bombay, India. Jan, 2006 - Jan, 2013.
- Project on 'Nano-structured Biodegradable Bone Graft' in 'India Innovation Initiative– i3 Regional Fair 2012 organised by DST, Govt. of India, Agilent Technologies andConfederation of Indian Industry (CII). SINE, IIT Bombay, India. 2012.

Granted/published patents and selected publications in the area of Tissue Engineering

- **NitinSagar,**Vivek P. Soni, Jayesh R. Bellare. A composite scaffold and a method for its preparation. Patent No. 407936; granted on September 29, 2022.

- **NitinSagar,**Vivek P. Soni, Jayesh R. Bellare. A method for preparing a composite scaffold comprising nanocrystalline hydroxyapatite, gelatin and carboxymethyl chitin. Patent No. 322400; granted on October 07, 2019.
- **NitinSagar,**Vivek P. Soni, Jayesh R. Bellare. A bioactive scaffold with tunable elasticity to initiate and instruct the stem cell growth and bone mineralization. IPA No. 1592/MUM/2015; filed on 2015-04-17, published on 2016-10-21.
- **NitinSagar,**Vivek P. Soni, Jayesh R. Bellare. 3D nanohydroxyapatite/ gelatin/carboxymethyl chitin composite engineered with controllable viscoelastic properties for guided bone regeneration. IPA No. 3221/MUM/2012; filed on 2012-11-06, published on 2014-07-04.
- **Sagar N***, KunalKhanna*, Varda S. Sardesai, AtulK.Singh, MayurTemgire, MridulaPhukanKalita, Sachin S. Kadam, Vivek P. Soni, DeepaBhartiya, Jayesh R. Bellare. Bioconductive 3D nano-composite constructs with tunable elasticity to initiate stem cell growth and induce bone mineralization. Materials Science and Engineering C. 2016;69:700-714.
- **Sagar N**, Atul Kumar Singh, Mayur K. Temgire, S. Vijayalakshmi, AlokDhawan, Ashutosh Kumar, NaibedyaChattopadhyay, Jayesh R. Bellare. 3D scaffold induces efficient bone repair: in-vivo studies of ultra-structural architecture at the interface. Biomedical Materials. RSC Adv. 2016;6:768-776.
- Tewari D, Khan MP, **Sagar N**, China SP, Singh AK, Kheruka SC, Barai S, Tiwari MC, Nagar GK, Vishwakarma AL, Ogechukwu OE, Bellare JR, Gambhir S, Chattopadhyay N. Ovariectomized rats with established osteopenia have diminished mesenchymal stem cells in the bone marrow and impaired homing, osteoinduction and bone regeneration at the fracture site. Stem Cell Rev. 2015;11(2):309-321.
- **Sagar N**, Soni VP, Bellare JR. In-vivo efficacy of compliant 3D nanocomposite in critical-size bone defect repair: a six month preclinical study in rabbit. PLoS One. 2013;8(10):e77578.
- **Sagar N**, Soni VP, Bellare JR. Influence of carboxymethyl chitin on stability and biocompatibility of 3D nano-hydroxyapatite/gelatin/carboxymethyl chitin composite for bone tissue engineering. J Biomed Mater Res B. 2012;100(3):624- 6.

- Singh AK*, **Sagar N***, Soni VP, Bellare JR. Development and assessment of 3D nano-bioglass/gelatin /CMC composite for bone tissue engineering. (Ready to submit).
- Mehta H, **Sagar N**, Soni VP, Bellare JR. Effect of Citric acid on Hydroxyapatite/ collagen composite and its efficacy using rabbit as animal model. (Manuscript under preparation).
- Seniya C, Mishra H, Yadav A, **Sagar N**, Chaturvedi B, Uchadia K, Wadhwa G. Antiviral potential of 4-hydroxypanduratin A, secondary metabolite of Fingerroot, Boesenbergiapandurata (Schult.), towards Japanese Encephalitis virus NS2B/NS3 protease. Bioinformation. 2013;9(1):54-60.
- Seniya C., Yadav A., Uchadia K., Kumar S., **Sagar N**, Shrivastava P., Shrivastava S., Wadhwa G. Molecular docking of (5E)-3-(2-aminoethyl)-5-(2-hienylmethylene)-1, 3hiazolidine-2, 4-dione on HIV-1 reverse transcriptase: novel drug acting on enzyme. Bioinformation. 2012;8(14):678-683.
- Singh S, Singh G, **Sagar N**, Yadav PK, Jain PA, Gautam B, Wadhwa G. Insight into trichomonasvaginalis genome evolution through metabolic pathways comparison. Bioinformation. 2012;8(4):189-95.

Conferences/Seminars and Presentations

- **Sagar N**, Soni VP, Bellare JR. Biomaterials and Their Assessment for Bone Tissue Engineering. Transaction in 8th World Biomaterials Congress (WBC - 08), Amsterdam, The Netherlands. May 28, 2008 - June 1, 2008.
- Jaiswal A, **Sagar N**, Soni VP, Bellare JR. Fabrication and Evaluation of Electrospun Nano-composite Scaffold for Bone Regeneration. 22nd European Conference on Biomaterials, European Society for Biomaterials (ESB), Lausanne, Switzerland. September 7-11, 2009.
- **Sagar N**, Jaiswal A, Soni VP, Bellare JR. Three-dimensional Hydroxyapatite and Gelatin Scaffold for Bone growth and Regeneration. 5th SBE (Society for Biological Engineering) International Conference on Bioengineering and Nanotechnology (ICBN 2010) Biopolis, Singapore. August 2-4, 2010.
- **Sagar N**, Soni VP, Bellare JR. Functionalization and Application of Nanohydroxyapatite and Gelatin Blend as an Artificial Bone Substitute for

Bone Cyst Treatment. International Society for Cell and Gene Therapy of Cancer (ISCGT) Mumbai, India. November 16-18, 2007.

- Singh A, **Sagar N**, Teotia R, Bellare J. Composite &ElectrospunNanofibrous Scaffold for Bone Tissue Engineering. ASP - 14 - Advances in Sustainable Polymers. Indian Institute of Technology, Guwahati. January 06-11, 2014.
- Singh AK, Rai RK, Gajiwala AL, **Sagar N**, Teotia RS, Soni VP, Vijayalakshmi S, Sinha N, Kumar A, Bellare J. Nuclear Magnetic Resonance (NMR) Study of Three Dimension (3D) Human Bone. National Magnetic Resonance Society Symposium. Indian Institute of Technology, Bombay. February 03-06, 2013.
- **Sagar N**, Singh AK, Soni VP, Bellare JR. Indo – US Bilateral Workshop (Indo-US Science and Technology Forum) on 21st Century Developments in Bone Regeneration, Gaiety Theatre, Shimla Hills, India. October 10-11, 2012.
- Avinash J. Patil*, **Sagar N***, GanpatDahe, VivekSoni, JayeshBellare. Preparation of ElectrospunNanofiber Collagen Scaffold and its Potential Application in Bone Tissue Engineering. Materials for Biomedical Applications. ABS – 841 – ICAM:G- O- 05. 10th International Conference on Advanced Materials (IUMRS-ICAM 2007). Hotel Grand Ashok, Bangalore, India. October 8-13, 2007.

Book Chapters

- Bhatt K, Singh AK, **Sagar N**, Kumar S, Khan GJ. Prospects of RNAi in Neurogenerative Disease. RNA Interference: Problems & Prospects; Jha, J.; Shree Publishers New Delhi, 2013; 90-104.
- Teotia RS, Lodhi SS, **Sagar N**, Kumar S, Bhatt K. Application of RNA Interference in Therapeutics. RNA Interference: Problems & Prospects; Jha, J.; Shree Publishers New Delhi, 2013; 155-168.

Fellowships and Awards

- Recipient of ‘All India M.Sc. Biotechnology research fellowshipprogramme/National Biotechnology Entrance Test’ conducted by JNU, India.
- Rank 1 in M.Sc. (Biotechnology), Gujarat University, Ahmedabad, India.

- Recipient of ‘Graduate Aptitude Test in Engineering (GATE) fellowship Award’ ofDepartment of Education, Ministry of Human Resources Development (MHRD),Government of India.
- Recipient of ‘Junior Research Fellowship (JRF)’, Human Resource DevelopmentGroup, Council of Scientific & Industrial Research (CSIR), India.
- Awarded ‘Teaching Assistant’ fellowship from Indian Institute of TechnologyBombay, India.
- Recipient of ‘Senior Research Fellowship (SRF)’, Human Resource DevelopmentGroup, Council of Scientific & Industrial Research (CSIR), India.
- Participated as team leader in top finalist team in ‘ELIXIR’ (Bio-business plancompetition) held at ‘TECHFEST 08’, IIT Bombay,
- Participated as team leader and team member in two of the top finalist team in‘TECHKRITI 2008’ (Bio-business plan competition) held at IIT Kanpur.
- Project on ‘Nano-structured Biodegradable Bone Graft’ in ‘India Innovation Initiative – i3 Regional Fair 2012 organised by DST, Govt. of India, Agilent Technologies and Confederation of Indian Industry (CII). SINE, IIT Bombay, India.
- Awarded Institute Travel Grant (IIT Bombay, India).
- Awarded Young Scientist Travel Grant (CSIR, India).

Lab Members

Updated very soon.

Opening/Positions

We are always looking and delighted to work with individuals who have an evenness of self-motivation and collaborative ideas to contribute in the areas of biomaterials, tissue engineering, drug delivery, and regenerative medicine. We are interested in Undergrad, Postgrad, Masters, PhD and Postdoc candidates having research and/or industrial experience. If you are interested in joining us, please mail ns.biomat@gmail.com and include your CV and a cover letter.

Contact:
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