School Seminar (2015-15)

School of Materials Science & Engineering

"Prospects of natural silk as bio micro–materials"

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(Dept. of Biotechnology, Indian Institute of Technology Kharagpur)

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APRI 1F, Auditorium Hall

Prospects of natural silk as bio micro- and nano-materials

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Biomicro- and nano-materials are being explored in biomedical applications including tissue engineering, biosensors, encapsulations, controlled release of drugs and other bioactive molecules. Silk is a natural biopolymer obtained from various categories of silkworms, which include mulberry (*Bombyx mori*) and non-mulberry. Silk proteins (fibroin and sericin) have established their roles in tissue engineering and regenerative medicines due to their cytocompatibility and provide support to the cells for attachment, proliferation and matrix production. They are used in different forms of matrices like film, scaffold, hydrogel, mat, nanofibers and nanoparticles. In our experiments we have used both micro- and nano preparations mostly as delivery systems for drug, antibiotics and growth hormones. The targeted delivery of anti-cancerous drugs based on the folate conjugated fibroin nanoparticles is achieved. The efficiency of 3D porous scaffolds embedded with the nanoparticles is evaluated in 3D distribution of bone -breast cancer cells.The silk fibroin - based drug carriers for pulmonary delivery targeted for lung cancer are also designed. Fibroin nanoparticles, which support osteoblast adhesion, proliferation and sustained antibiotic release simultaneously on titanium surface are investigated. Reinforcing 3D fibroin scaffold with hydroxyapatite-fibroin nanocomposites are prepared for investigating the bone forming potential. Electro-spun nanofibrous mats of fibroin blended with polymers (poly-vinyl alcohol and poly- caprolactone) are fabricated for bone tissue engineering application. Similarly the carbon nano fiber reinforced fibroin matrices are developed for load bearing orthopedic applications. The results of above investigations will be discussed.

BIOGRAPHICAL SKETCH OF SC KUNDU

Name: Subhas C. **Kundu**

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Education: Place and year of degree Visva Bharati University, Shantineketan, Under-graduation, (First class and third rank in the University) Year 1964,

Banaras Hindu University, India: Graduation and post-graduation (First class and second rank in the University) Year 1970 and Ph. D Year 1975

Area of specialization: Genetics, Biomaterials

Position and Employment

Sl No.	Institution Place	Position	From (Date)	To (date)
1.	Indian Institute of Technology, Kharagpur	Professor of Biotechnology	July 1994	December 2015
2.	Manipur University, Imphal	Professor and Ex-Head, Department of Life Sciences	June 1975	June 1993
4.	Department of Biology and Biochemistry, Brunel University, UK	Association for International Cancer Research Fellow,	1993-94	1995
5.	Institute for Pathology, Lubeck, West Germany	Alexander von Humboldt Fellow	1982	1983
6.	Department of Biology, York University, Canada	NRC Postdoctoral Fellow	1981	1982
7.	Institute of Molecular Biology, Moscow, USSR	USSR Govt. Post Doctoral Fellow	1976	1977