



കൊച്ചി ശാസ്ത്ര സാങ്കേതിക സർവ്വകലാശാല
COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY



REGISTRAR

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Citation (summary) on the outstanding research work on which award is claimed in about 250 words **signed** by the nominator.

Customized Combinatorial Approaches in Regenerative Bone tissue engineering for the Treatment of Bone loss and Bone diseases

Prof. Sailaja's research in biomaterials and bone tissue engineering commenced with her Ph.D. tenure at SCTIMST, India, where she has developed a surface phosphorylated copolymer that invoked **new bone formation in vivo**, validated in rabbit model as per ISO 10993 (*Tissue Engineering 2009, Acta Biomaterialia 2009*). With exquisite efforts and expertise, she has trained her students to develop better performing novel platforms. The surface phosphorylation protocol she developed is customized to biomimetically modify *any polymer*-having -OH groups to elicit osteogenesis *in situ* or *sequentially* as part of **customized combinatorial therapy** to treat **osteomyelitis** (sustained antibiotic (Ciprofloxacin) release followed by osteogenesis) and **osteosarcoma** (sustained chemotherapeutic drug (Doxorubicin) release followed by osteogenesis) aiming to eliminate need of multiple surgeries (*Mater Sci and Eng C 2020, ACS Biomater Sci and Eng 2021, Intrinsically radiopaque and osteogenic bone cement-Indian Patent application- 2021* etc.). The investigation to understand the mechanism of osteogenesis by surface phosphorylation is supported by *SERB NPDF 2021* (Basic research). She continually tried to improve the regenerative potential and bioresorbability of the scaffolds by integrating phytochemicals into **natural** polymer scaffolds by *in vitro* and *in vivo* (*J BioSci-2021, NJC-2021*).

In alternative therapeutic approaches, surface phosphorylation has been explored for the development of *pH dependent and magnetically targeted controlled drug delivery systems* (*Mat. Chem and Phys. 2021*); magnetic and radiopaque nanocomposites with **magnetic hyperthermia** as well as biomineralization potential for **osteosarcoma (nanotheranostic;** *Biomed Mater. 2021, NJC 2021*) and a **completely biodegradable** porous bone regenerative scaffold with **enhanced osteogenesis** via microfiber-fillers from an ayurvedic herb (*Indian Patent No:202141026897; 2021*).

Prof. Sailaja's contributions in regenerative bone tissue engineering is commendable, evidenced by significant publications and patents.




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