IIT Kharagpur to develop coin-sized biological computers for medical treatment

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ETHealthWorld | Updated: August 01, 2018, 20:41 IST

New Delhi: IIT Kharagpur has set up Bioelectronics Innovation Laboratory to develop battery-free implantable medical devices for treatment of brain, nerve, muscle or spinal cord disorders that are untreatable by using standard medical practices.

"We aim to implant coin sized electronic chips with wireless energy supply for rehabilitation and prostheses applications. Unlike the standard pace-makers that require a surgery every 5 to 10 years due to limited battery-life, our solutions depend on wireless power transfer and intelligent communication schemes. The novel bioelectronic devices will be able to sense bio-signals, process information to make intelligent decisions, and control diseased organs by electrical methods" explained Prof. Sudip Nag from the Department of Electronics and Electrical Engineering who is heading this initiative at IIT Kharagpur.
"The present line of research targets subjects with blindness, limb paralysis, sensory-motor dysfunction, cognition-loss, parkinsons tremor, epileptic seizures, and even memory-loss."

Bioelectronics utilizes the intersecting knowledge of both electronics and biology. Bioelectronic devices generally target to restore missing neural functions, while utilizing energy efficient and miniaturized engineering systems.

According to Nag, these solutions will incorporate a combination of electrical stimulation, bio-potential recording and neuro-chemical sensing. Alos, this will enhance the life-time of implants and reduce the number of surgical interventions.

The laboratory will facilitate energy efficient electronic system development, biocompatible packaging, bio-reliability assessment and animal testing rooms as a unified platform for an end-to-end intelligent medical system development. Grants have been received from IIT Kharagpur, under MHRD Imprint program and SFTIG Indo-Canadian Fellowship grant. It is in the process of setting up collaborations with several hospitals and institutes in India and abroad.