

Transient Bioelectronic Medicines

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A remarkable feature of modern integrated circuit technology is its ability to operate in a stable fashion, almost indefinitely, without physical or chemical change. Recently developed classes of electronic materials create an opportunity to engineer the opposite outcome, in the form of ‘transient’ devices that dissolve, disintegrate, degrade or otherwise physically disappear at triggered times or with controlled rates. Water-soluble classes of transient electronic devices serve as the foundations for applications in zero-impact environmental monitors, 'green' consumer electronic gadgetry and bio-resorbable medical implants. This talk describes the foundational concepts in materials science, electrical engineering and assembly processes for bio/ecoresorbable electronics in a variety of formats and with a range of functions. Wireless stimulators that accelerate neuroregeneration of injured peripheral nerves and pacemakers that minimize risks after cardiac surgeries represent some recent system level examples.