Energy storage silk implant

Are energy storage implants biocompatible?
Existing energy storage implants grapple with balancing factors such as high performance,biosafety,mechanical properties matching soft tissues,and conformal adhesion. Herein,we report a thin,flexible,and wet-adhesive zinc-ion hybrid supercapacitor (ZHSC) as an implantable power source with high biocompatibilityand superior performance.

What is pure silk?
Pure silk is innovatively employed,which is known for its excellent biocompatibility,to engineer water-triggered,geometrically reconfigurable membranes,on which functions can be integrated by Micro Electro Mechanical System (MEMS) techniques and specially functionalized silk.

Can silk fibroin-based ion-exchange membranes power implanted medical devices?
Powering implanted medical devices (IMDs) is a long-term challenge since their use in biological environments requires a long-term and stable supply of power and a biocompatible and biodegradable battery system. Here, silk fibroin-based ion-exchange membranes are developed using bionics principles for reverse electrodialysis devices (REDs).

Can Silk sericin be implanted based on a piezoelectric principle?
To address this demand,it is proposed utilizing a natural biomaterial,silk sericin (SS),which exhibits valuable biological activities and contains abundant asymmetric amino acids with adjustable structures,to create an implantable self-powered system based on the piezoelectric principle.

Do functional bioelectronic implants need energy storage modules?
Functional bioelectronic implants necessitate energy storage modulesas power sources in vivo. Existing energy storage implants grapple with balancing factors such as high performance,biosafety,mechanical properties matching soft tissues,and conformal adhesion.

What is a stretchable energy supply device for implantable electrical stimulation?
Yuan et al. proposed a stretchable, rechargeable energy supply device for implantable electrical stimulation (Fig. 3 d). This innovative device incorporates a stretchable energy-receiving coil, conductive wiring, and supercapacitor current collectors, all fabricated using liquid metal components integrated onto an elastic substrate.

With an increasing global concern for climate change and the dwindling reserves of fossil fuels, silk (or silk-derived) hybrid materials are a promising avenue of scientific ...

A flexible battery made of silk films could power temporary medical sensors and implants in the body and then harmlessly melt away once its work is done (ACS Energy Lett. 2017, DOI: ...

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Current cardiovascular implantable electronic devices (CIEDs) face a pressing clinical need for the development of battery-free, biodegradable, and biocompatible devices to mitigate the risk ...

Integrating an energy harvester and energy storage into a single unit, without connecting any external source, has gathered substantial attention for its ability to convert and store energy in ...

Driven by the rapid development of wear-able electronic devices and flexible energy storage technologies, there is an increasing demand for safe, cost-effective, and high-capacity power ...

Continued investigation of fibroin and sericin in energy storage applications could unlock new possibilities, allowing silk to play a crucial role in the development of sustainable ...

The evolution in the field of energy storage devices has gained the scrutiny of many researchers due to their inevitable applications in everything from convenient electronic ...

The integration of energy storage and delivery devices such as supercapacitors (SCs) with properties such as flexibility, miniaturization, biocompatibility, and degradability are sought for ...

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