Electronic Device for Communication With Living Cells (Golden Brain) (Yissum)

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Electrical and chemical coupling between living cells and an electronic device

Categories	Bio-molecular electronics
Development Stage	Ongoing research
Patent Status	Patents filed in US, Europe, Singapore, Japan and Israel
Market Size	2009 global market for biosensors and other bioelectronics to reach $8.2 billion

Highlights

- Electrical and chemical communication (functional linking) between cells such as neurons and the surfaces of substrates that are part of electronic devices
- Generic technology can serve as the basis for the construction of biomedical devices that can, for example, be used to link nerves to a robotic prosthesis, allowing prosthesis to be controlled by the brain

Our Innovation

Tight physical linkages are formed between cells and surface substrates by taking advantage of the cell's natural propensity to engulf elements outside themselves by phagocytosis/pinocytosis or endocytosis. The cells engulf nano- to micro-scale protrusions called "micronails," which have been constructed on the surface of the substrate.

Key Features

- Reliable and durable bi-directional electrical and chemical communication between cells and electronic devices
- The head of the micronail may be inserted into the cytoplasm, enabling the nail be used for intracellular recording and stimulation of electrical signals or as an intracellular chemical detector. The inserted micronail can be also used as a micro syringe to deliver materials into the cytoplasm or suck cytoplasm out of the cells.
- The system can be used to screen drugs or for the development of ex-vivo neuroelectronic computer hybrids.

The Opportunity

- Can be used to link damaged neuronal networks; to restore vision after retinal or optic nerve damage; to stimulate a secretor, etc.
- Can be used to detect chemical and biological contaminations
- Can also be used to screen drugs or for the development of ex-vivo hybrids between electronic devices, cells and molecules

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