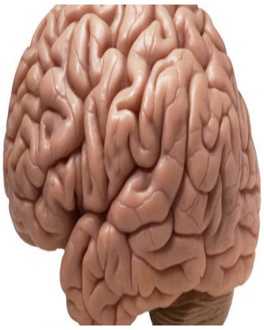
Cyborg Technology: The Future



The world's largest scientific society, the American Chemical Society (ACS) is holding its 248th National Meeting & Exposition, offering nearly 12,000 presentations on a wide range of science topics.

One such presentation highlights the impressive developments in cyborg technology, which is producing tangible results in the domains of prosthetics, real-life electronic skin and ultraflexible circuits, literally bringing the human-machine concept to life.

Pioneering scientists are sharing their work on combining electronics and brain signalling targeted at improving our understanding of the brain, and subsequently treating some of its most debilitating diseases.

Charles M. Lieber, PhD explains that the research focus is on the nanoelectronic connections between cells, allowing the team to accomplish previously impossible things and potentially bypass a number of neurodegenerative diseases in the future. Malfunctioning nerve cells, as in Parkinson's, can make the most basic movements difficult, such as talking, walking, eating and swallowing.

"We are really going into a new size regime for not only the device that records or stimulates cellular activity, but also for the whole circuit. We can make it really look and behave like smart, soft biological material, and integrate it with cells and cellular networks at the whole-tissue level", Lieber says.

Due to the fact that the brain, the body's most complex organ, is inaccessible to real-time detailed scrutiny, scientists are facing a challenge in the fight against neurological disorders. The unprecedented use of nanoelectronics could allow an inside view into cells and their malfunctioning.

Over the past several years, Lieber's work has been around dramatically shrinking cyborg science to a level thousands of times more flexible and smaller than previous bioelectronic research efforts. His team's ultrathin nanowires are capable of monitoring and influencing the inside work of cells. They have been used in the construction of ultraflexible, 3-D mesh scaffolding, to which hundreds of addressable electronic units were added to grow living tissue over.

The team has also achieved the development of the tiniest electronic probe ever, able to record even the fastest intra-cell signalling, which controls all of the body's movements.

In the early stages, Lieber's latest mission is to uncover how to inject their ultraflexible, minute electronics into the brain and enable them to fully integrate with the existing biological web of neurons.

Lieber is keeping an open mind with regards to the work's outcome, however he is convinced that the unique approach will bear revolutionary results.

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