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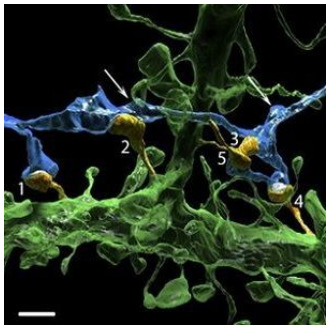
New Imaging Tool: Probe Into the Brain



A new imaging tool has allowed Boston scientists to look inside the brain of an adult mouse at a scale previously unachievable, generating images at a nanoscale resolution. The researchers' goal is to make the resource available to the scientific community in the form of a national brain observatory. Their work is reported in the journal *Cell*.

The researchers have begun the process of mining their imaging data by looking first at an area of the brain that receives sensory information from mouse whiskers, which help the animals orient themselves and are even more sensitive than human fingertips. They used a program called VAST, developed by co-author Daniel Berger of Harvard and the Massachusetts Institute of Technology, to assign different colours and piece apart each individual "object" (eg, neuron, glial cell, blood vessel cell, etc.).

"The complexity of the brain is much more than what we had ever imagined," says the study's first author Narayanan Kasthuri, of the Boston University School of Medicine. "We had this clean idea of how there's a really nice order to how neurons connect with each other, but if you actually look at the material it's not like that. The connections are so messy that it's hard to imagine a plan to it, but we checked and there's clearly a pattern that cannot be explained by randomness."

The research team sees great potential in the new imaging tool's ability to answer questions about what a neurological disorder actually looks like in the brain, as well as what makes the human brain different from other animals and different between individuals. Who we become is very much a product of the connections our neurons make in response to various life experiences, according to the researchers. To be able to compare the physical neuron-to-neuron connections in an infant, a mathematical genius, and someone with schizophrenia would be a leap in our understanding of how our brains shape who we are (or vice versa).

The cost and data storage demands for this type of research are still high, although the researchers expect expenses to drop over time (as has been the case with genome sequencing).

To facilitate data sharing, the research team is now collaborating with Argonne National Laboratory with the hopes of creating a national brain laboratory that neuroscientists around the world can access within the next few years.

Source and image credit: Cell Press

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