# How big science failed to unlock the mysteries of the human brain

Large, expensive efforts to map the brain started a decade ago but have largely fallen short. It's a good reminder of just how complex this organ is.

By Emily Mullin

Aug 24, 2021 08:42 AM · 2 min. read · View original

When I asked Ebell what he sees as the biggest accomplishment of the Human Brain Project, he didn't name any one scientific achievement. Instead, he pointed to EBRAINS, a platform launched in April of this year to help neuroscientists work with neurological data, perform modeling, and simulate brain function. It offers researchers a wide range of data and connects many of the most advanced European lab facilities, supercomputing centers, clinics, and technology hubs in one system.

"If you ask me 'Are you happy with how it turned out?' I would say yes," Ebell said. "Has it led to the breakthroughs that some have expected in

terms of gaining a completely new understanding of the brain? Perhaps not."

Katrin Amunts, a neuroscientist at the University of Düsseldorf, who has been the Human Brain Project's scientific research director since 2016, says that while Markram's dream of simulating the human brain hasn't been realized yet, it is getting closer. "We will use the last three years to make such simulations happen," she says. But it won't be a big, single model—instead, several simulation approaches will be needed to understand the brain in all its complexity.

Meanwhile, the BRAIN Initiative has provided more than 900 grants to researchers so far, totaling around $2 billion. The National Institutes of Health is projected to spend nearly $6 billion on the project by the time it concludes.

For the final phase of the BRAIN Initiative, scientists will attempt to understand how brain circuits work by diagramming connected neurons. But claims for what can be achieved are far more restrained than in the project's early days. The researchers now realize that understanding the brain will be an ongoing task—it's not something that can be finalized by a project's deadline, even if that project meets its specific goals.

“With a brand-new tool or a fabulous new microscope, you know when you’ve got it. If you’re talking about understanding how a piece of the brain works or how the brain actually does a task, it’s much more difficult to know what success is,” says Eve Marder, a neuroscientist at Brandeis University. “And success for one person would be just the beginning of the story for another person.”

Yuste and his colleagues were right that new tools and techniques would be needed to study the brain in a more meaningful way. Now, scientists will have to figure out how to use them. But instead of answering the question of consciousness, developing these methods has, if anything, only opened up more questions about the brain—and shown just how complex it is.

“I have to be honest,” says Yuste. “We had higher hopes.”

*Emily Mullin is a freelance journalist based in Pittsburgh who focuses on biotechnology.*