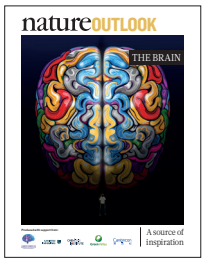
nature OUTLOOK

THE BRAIN

25 July 2019 / Vol 571 / Issue No 7766



Cover art: Sam Falconer

In the hand, the human brain is a jelly-like mass, easily deformed by touch. However, its unassuming appearance belies the complexity within. The brain's inner workings are mysterious. But our understanding of them is improving, as is our ability to apply that knowledge elsewhere.

The human brain contains one hundred billion neurons, which are connected by trillions of synapses. Building a map of these connections — the connectome — is not an easy task, but is progressing faster than predicted (see page S6). Such a map is crucial to efforts to simulate the brain *in silico*. But it is not the only requirement: we also need a better understanding of how the brain works (S9). Scientists who work on memory are recognizing that forgetting is not an error but an essential process (S12). The biological basis of consciousness is becoming a legitimate topic for research (S2). And our evolutionary brethren the Neanderthals, through fossilized remains and genetic traces found in modern humans, are providing fresh insight into how our brains developed (S10).

Our improved understanding of the brain is also informing the development of smarter artificial intelligences (S18). In a virtuous loop, improving artificial intelligence will give neuroscientists more powerful tools with which to investigate the brain (S15). The technology behind brain–computer interfaces is making great strides, but there are ethical concerns — no invasive procedure is without risk, and the danger is magnified when a misstep threatens the brain (S19).

We are pleased to acknowledge the financial support of the Shanghai Research Center for Brain Science and Brain-Inspired Intelligence, United Imaging Healthcare Technology Group Co. Ltd, the Tianqiao and Chrissy Chen Institute Clinical Translational Research Center, Shanghai Green Valley Pharmaceutical Co. Ltd and Cambricon Technologies Corporation in producing this Outlook. As always, *Nature* retains sole responsibility for all editorial content.

Richard Hodson
Supplements editor

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CITING THE OUTLOOK
Cite as a supplement to *Nature*, for example, *Nature* **Vol. XXX**, No. XXXX Suppl., Sxx–Sxx (2019).

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