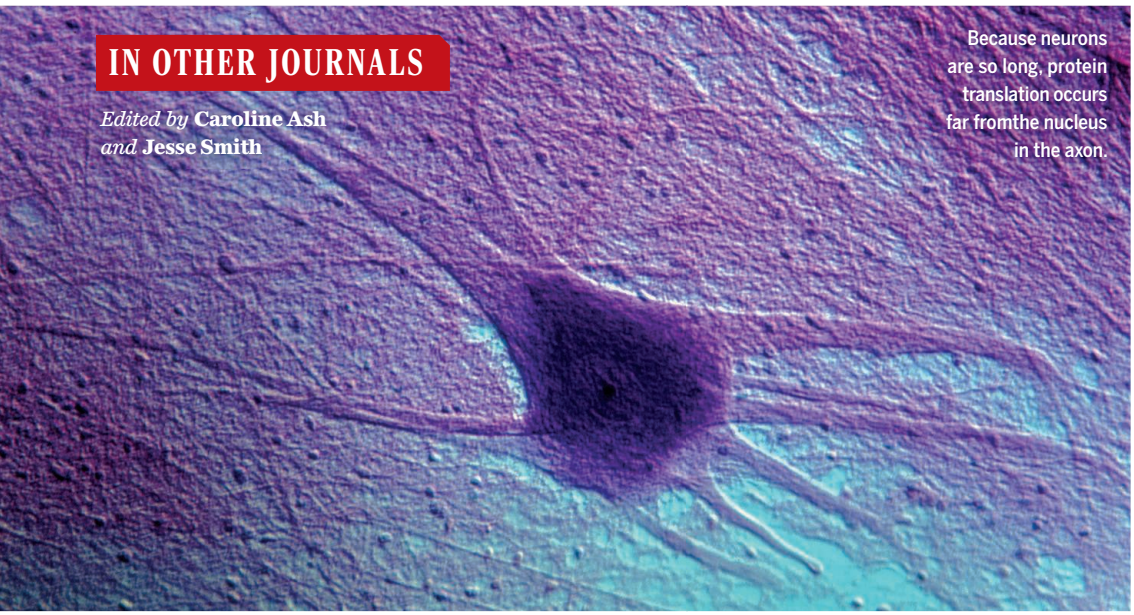

IN OTHER JOURNALS

Edited by **Caroline Ash** *and* **Jesse Smith**

Because neurons are so long, protein translation occurs far fromthe nucleus in the axon.

CELLULAR NEUROSCIENCE

Location, location, location

Neurons are composed of a cell body decorated with long processes—the dendrites and the axon. The normal maintenance of functions in the axon requires it to perform processes normally associated with events in the nucleus, which, in neurons, is quite distant. Cioni *et al*. studied local translation of proteins in the axons of retinal ganglion cells. They found that RNA granules were associated with late endosomes and ribosomes. Furthermore, they observed these endosomes "pausing" close to axonal mitochondria. These interactions may be important in regulating the supply of key proteins for maintaining healthy axons. Indeed, the neuropathological mutations associated with Charcot-Marie-Tooth disease disrupt axonal translation and damage axonal mitochondria. —SMH

Cell **176**, 56 (2019).

NEUROSCIENCE

Risky firing of prefrontal neurons

Neuronal activity in the prefrontal cortex can predict decision-making. Flexible decision-making, such as choices made during gambling, relies on unguided probabilistic evaluation. Passecker *et al*. show that a subclass of neurons in a subregion of the rat prefrontal cortex called the prelimbic cortex can foresee future choices. Rats were trained on a gambling task, during which they could choose between a large-but-uncertain reward or a small-but-certain one. When they did not receive a reward on a chosen maze arm, their prelimbic neuron firing pattern—observed well before executing their decision—anticipated the animals' next choice. When these cells are optogenetically silenced, rats display increased gambling behavior, taking more risks by opting for larger rewards. Disruption to the prelimbic cortex could lead to excessive risk taking. —EACP

Neuron **101**, 152 (2019).

IMMUNOLOGY

T cells traffic at fever pitch

Fever is an evolutionarily conserved response triggered by injury and infection that promotes survival. But the mechanisms underlying this protective effect are not well understood. High fever (40°C) in mice induces the expression of various heat shock proteins, including Hsp90. Lin *et al*. report that Hsp90 promotes T cell adhesion and transmigration by binding to and activating α4 integrins. If the α4 integrin–binding motif is mutated in mice, fever-induced T cell trafficking is inhibited and bacterial clearance impaired. Possibly, the trafficking of other immune cells is similarly affected by this signaling axis. —STS

Immunity **50**, 137 (2019).

NANOPHOTONICS

Optomechanical control of light scattering

The development of nanophotonic technology requires the ability to control and manipulate the directional scattering of light. Poshakinskiy and Poddubny show, theoretically, that "trembling" dielectric nanoparticles could be used to control the direction of scattering. As the dielectric particle possesses an electric dipole, the oscillating (or trembling) motion induces an artificial magnetic resonance within the particle. These electric and induced magnetic dipoles can then interfere with the scattered light, thus providing a mechanism for controlling the relative amount of light scattered in the forward and backward directions. As the optomechanical technique is general, the authors suggest that it could be applied to control the light-matter interactions in a variety of materials systems. —ISO

Phys. Rev. X **9**, 011008 (2019).

CLIMATE

Increasing heatwave activity

Global warming is leading to more, and more intense, heatwaves just about everywhere. Chapman *et al*. investigate some of the details of that trend in central England using a high-precision temperature record that covers the period from 1878 to the present. They show that there has been a two- to threefold increase in heatwave activity since the late 1800s and that week-long heatwaves with an average return period of 5 years now typically exceed the 28°C threshold, which, in the past, was the usual ceiling. Their analysis provides a quantitative benchmark for models used for the attribution of heatwaves. —HJS

Geophys. Res. Lett. 10.1029/2018GL081004 (2019).

SPINTRONICS

Strain controls antiferromagnetism

Antiferromagnetic (AFM) materials—materials in which neighboring spins point in opposite directions—have an important advantage over the better-known ferromagnets: Their properties are much less sensitive to external magnetic fields. This, however, also makes AFM devices trickier to control. Yan *et al*. grew a film of AFM manganese platinum on a piezoelectric substrate. Applying an electric field resulted in strain in the substrate through the inverse piezoelectric effect. This strain in turn altered the magnetic properties of the adjacent AFM film, changing its electrical resistance. Based on this mechanism, the researchers were able to electrically switch the resistance of the film between two values, an operation that was insensitive to magnetic fields up to 60 tesla. —JS

Nat. Nano. 10.1038/s41565-018-0339-0 (2019).

T cells traffic at fever pitch

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