GENETICS

The sooty mangabey's sequence

Nature **553**, 77–81 (2018)

Nonhuman primates have been critical models for understanding the pathogenesis of HIV in humans and the development of effective antiretroviral drugs. Macaques, which are susceptible to SIV (simian immunodeficiency virus) and develop symptoms similar to human AIDS, have been particularly important to researchers. However, just as important to understanding why SIV causes AIDs in some species of primates, it's also critical to understand why other species can be infected, but never develop symptoms.

In a new paper, researchers sequenced the whole genome of sooty mangabey (*Cercocebus atys*), which are natural hosts of SIV but do not develop AIDS despite high viremia, and found significant differences in the coding sequence of several immune related genes compared with other AIDS-susceptible primate species. The team focused on two genes that showed the largest differences between sooty mangabey and other primates, namely toll-like receptor-4 (*TLR4*) and intercellular adhesion molecule 2 (ICAM-2). Combining genomics with functional assays, the researchers confirmed significant immunological consequences to the sequence differences in these two genes, and conclude that they are potentially important candidates for regulating host resistance to AIDS. *DG*

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EVOLUTION

Independent nerves

Nature **553**, 45–50 (2018)

There is an ongoing debate about the evolutionary history of nerve cord development in Bilateria, and a recent paper in *Nature* provides new evidence that the variety of nerve cord types seen in several species evolved independently, as opposed to arising from a single common ancestor.

Using molecular and anatomical techniques and studying representatives of Xenacoelomorpha, Rotifera, Nemertea, Brachiopoda, and Annelida, the authors found that none of the species showed a conserved pattern of molecular regionalization of nerve cord. In addition to providing evidence for convergent evolution of nerve cords, the new work also places restrictions on the use of molecular patterns to explain the evolution of nervous system anatomies. *DG*

https://doi.org/10.1038/s41684-018-0014-y

ANTIVIRALS

Nanoparticles vs. viruses

Nat. Mater. https://doi.org/10.1038/nmat5053 (2017)

Broad-spectrum and effective antiviral drugs are difficult to come by, and many of the most deadly viruses still do not have vaccines to provide protection in humans. In new work led by David Lembo, Francesco Stellacci and colleagues, they have taken advantage of a mechanism in viruses for cell interaction, combined with nanoparticles, to make a new broad-spectrum antiviral.

The team designed nanoparticles with long linkers that mimic heparin sulfate proteoglycans (HSPG), a conserved surface protein used by viruses in the first steps to binding to cells for infection. Testing the nanoparticles in several *in vitro* and *in vivo* assays, the team shows that they bind strongly to a wide range of viruses and effectively inhibit them from infecting cells. *DG*

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NEUROREGENERATION

Fish concussions

eNeuro https://doi.org/10.1523/ENEURO.0208-17.2017 (2018)

Researchers interested in the neuroregenerative abilities of the zebrafish brain have a new way to model mild traumatic brain injury (TBI). Previous approaches involved physically penetrating the brain, but that's a bit more severe that what many concussion patients experience. Taking inspiration from weight drop apparatuses commonly used to model TBI in rodents, a team at the Keck Science Department in Claremont, CA has developed a relatively simple device for use in an aquarium tank that jolts the brain without causing external damage.

During validation testing, adult zebrafish that took the small ball-bearing to the head (while anesthetized) performed worse on a spatial memory behavioral test than their non-concussed counterparts. With the new model, the researchers were also able to take an initial look at differentially expressed genes post-injury. *EN*

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