BONE

Capturing new capillaries

Grüneboom et al. *Nat Metab* https://doi.org/10.1038/s42255-018-0016-5 (2019)

Blood exchange between the general circulatory system and the interior of long bones is quick, but the means of entry and exit has been elusive. It turns out that there were hidden structures just waiting to be revealed.

To look beneath the long bones, researchers from University Duisburg-Essen in Germany used a technique called simpleCLEAR to make murine femurs and tibiae transparent and then imaged the samples with light-sheet fluorescence and X-ray microscopes. In addition to 16 nutrient arteries and a central sinus with two exits to supply blood flow, they discovered hundreds of previously unknown capillaries that line the entire lengths of the bones and connect their inner and outer surfaces. Those small capillaries have big impact—over 80% of arterial and 59% of venous blood circulate through them. *EPN*

https://doi.org/10.1038/s41684-019-0256-3

EXPERIMENTAL ORGANISMS

Squid sequence

Belcaid, et al. *PNAS* https://doi.org/10.1073/pnas.1817322116 (2019)

The bobtail squid, *Euprymna scolopes*, is a model cephalopod that now joins *Octopus bimaculoides* in having its genome sequenced. Like its eight-armed relative, the bobtail's genome is large and quite repetitive—over 50% of elements were repeated. There are also signs that much of the bobtail's genome has been considerably reorganized since its split from the last common ancestor to other bilaterian animals.

Genetic signatures were particularly distinct in two areas specialized in the squid to house symbionts: the light organ, where bioluminescent *Vibrio fischeri* reside, and the accessory nidamental gland, a reproductive organ that also harbors a bacteria population. Genes in the former structure are related to immunity and the eye, while the genes in the latter appear unique to the bobtail, suggesting different evolutionary trajectories to foster symbiotic relationships. *EPN*

https://doi.org/10.1038/s41684-019-0257-2

BIOPHYSICAL METHODS

Measuring tiny forces

Backholm, M. and Bäumchen, O. *Nat Protoc* **14**, 594–615 (2019)

Mechanical forces, if tiny ones, are hard at work in the body of small organisms like *Caenorhabditis elegans* worms or microalgae like the flagellated *Chlamydomonas*. Pico- to-millinewton-scale forces govern the dynamics between molecules and cells and are produced as the small creatures move about, but taking those measurements has been technically challenging. A protocol to do so, originally demonstrated with *Chlamydomonas* in *Nature Physics* has now been described in step-by-step detail in *Nature Protocols*. The researchers use swimming *C. elegans* as an example application, but the sensor can be used record forces in soft samples that are micro- to millimeters in size. It involves creating a force sensor from a flexible micropipette and calibrating it with water droplets. Deflections in the micropipette reflect the force being exerted. *EPN*

https://doi.org/10.1038/s41684-019-0258-1

GASTROINTESTINAL DISEASES

Additive effects fly

Pereira, M.T et al. *Dis Model Mech* **11**, dmm034520 (2018)

A number of conditions like Crohn's disease, celiac disease, and irritable bowel syndrome are the result of increased intestinal permeability. Instances of the conditions are rising, and diet—food additives, in particular—is thought to be playing a role. Researchers at Binghamton University in New York recently considered the effect of several dietary additives on intestinal integrity in the fruit fly, via the "Smurf assay," as well as in *in vitro* cultures.

In healthy flies, the blue dye they are fed normally remains in the gastrointestinal tract; those with 'leaky' guts turn blue elsewhere. In the current study, a high-sugar diet caused the greatest disruption to intestinal integrity (and the most blue flies), followed by an emulsifier and to a lesser extent, high salt, though via different disruptive mechanisms. *EPN*

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