IN BRIEF

MICROSCOPY

Imaging cleared tissues with ease

Glaser, A. K. et al. *Nat. Commun.* **10**, 2781 (2019).

Tissue-clearing methods enable imaging within large, otherwise intact samples, such as whole tissues and even animals. Light-sheet microscopy has become a method of choice for imaging cleared samples, due to its high speed and relatively low light doses. However, existing light-sheet microscopes can place severe constraints on sample size and mounting geometry, and can be challenging to adapt to different sample-clearing methods due to differences in the samples' refractive indices. Glaser et al. have developed an open-top light-sheet microscope that bypasses these challenges to facilitate high-throughput imaging of any type of cleared tissue. The open top geometry enables large samples to simply be placed above the objectives, and the multi-immersion capability of the detection objective covers the refractive index range of published clearing methods. As a demonstration, the researchers imaged a range of cleared and expanded samples. *RS*

https://doi.org/10.1038/s41592-019-0557-x

MICROBIOLOGY

Describing human gut microbiota

Raman, A. S. et al. *Science* **365**, eaau4735 (2019).

The organization of microbiota is often described by the abundance of its members, which does not necessarily reflect the dynamic, complex interactions between microorganisms. Raman et al. explore the use of covarying units to describe the development of human gut microbiota. The idea of covarying units emerged from the premise that conserved covariation across microbiota may provide insights about the developmental process of microbial communities. The researchers thus developed a statistical workflow to identify conserved taxon–taxon covariance in bacterial communities of the human gut. After analyzing samples from a Bangladeshi birth cohort, they were able to define an 'ecogroup' of 15 microorganisms that could serve as a metric to measure the state of microbiota development. They demonstrated that this ecogroup can distinguish the microbiota of children with different degrees of malnutrition. In addition to the Bangladeshi birth cohort, the ecogroup can also capture the conserved features in microbiota development of healthy Peruvian and Indian birth cohorts. *LT*

https://doi.org/10.1038/s41592-019-0559-8

CELL BIOLOGY

Selecting haploid cells

Olbrich, T. et al. *Cell Rep.* **28**, 597–604 (2019).

A diploid genome is an asset in many ways, as it ameliorates the effect of mutations and ensures genetic diversity. But having two copies of each gene is less ideal if the goal is to knock genes out to test their function in forward genetic screens. Somatic haploid cell lines, such as HAP1 isolated from a leukemia patient and converted to adherent cells, are a great resource that gets around the problem of having to target two copies, but they are not easy to maintain in culture. Haploid cells quickly revert back to their more stable diploid state. Olbrich et al. performed a chemical screen on 977 compounds to find candidates that can maintain HAP1 cells in their haploid state. They found 10-deacetylbaccatin-III (DAB), a natural chemical isolated from the yew tree and precursor to a drug used to treat a parasitic disease in cattle, to be most effective in maintaining haploidy. DAB also proved effective in selecting for diploid cells in a mixture of 2n and 4n cells. DAB affects microtubule dynamics and leads to a prolonged arrest during mitosis; the higher the ploidy of a cell, the longer the mitotic arrest, which is often followed by cell death. *NR*

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NEUROSCIENCE

Targeting neurons synthetically

Jüttner, J. et al. *Nat. Neurosci.* **22**, 1345–1356 (2019).

The ability to target, manipulate and record from defined cell types is imperative for understanding neural circuits. However, we are still limited in our ability to target many distinct cell types. To address this shortcoming, Jüttner et al. created 230 adeno-associated viruses that harbored synthetic promoters and a reporter, and conducted a screen in the mouse eye for expression in specific cell types or limited groups of cell types. The researchers identified 32 synthetic promoters that exhibited useful expression patterns. Synthetic promoters that consisted of previously identified cis-regulatory elements with low methylation levels proved to be most successful. Rods, cones, and different classes of amacrine and ganglion cells could be targeted by the synthetic promoter strategy. For additional specificity, the researchers tested an AND gate strategy involving Cre recombinase and a Cre-dependent expression cassette. A subset of the synthetic promoters was also expressed in the macaque retina in vivo and in the human retina ex vivo. *NV*

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