TOOLS IN BRIEF

STRUCTURAL BIOLOGY

GPCR function insights by cryo-EM

Impressive technical advances in cryo-electron microscopy (cryo-EM) are enabling researchers to solve ever-smaller protein complexes at improving resolutions. The recently developed 'Volta phase plate' is stirring excitement with its ability to collect single-particle cryo-EM images with improved contrast. Liang *et al*. used this phase plate to help solve the full-length, near-atomic-resolution structure of an activated class-B G-protein-coupled receptor (GPCR; calcitonin receptor) in complex with a peptide agonist and G protein, weighing just 150 kDa. Several GPCR structures have been solved using X-ray crystallography, but most of these required extensive engineering efforts; no activated, full-length class-B-receptor structures have been reported. The work thus demonstrates the potential of cryo-EM for structure determination of unmodified, wild-type GPCR complexes, which may be of particular interest for drug discovery.

Liang, Y.-L. *et al. Nature* http://dx.doi.org/10.1038/nature22327 (2017).

IMAGING

Deep learning improves image analysis

Automated image analysis methods can be useful for improving the quality and speed of quantitative assessment of images. Deep-learning methods have emerged as powerful tools for improving image analysis beyond what is capable with existing computational pipelines. Kraus *et al*. build on this trend by developing DeepLoc, a deep convolutional neural network to analyze images of yeast cells. A benefit of this approach is that extensive training is not needed to use the model on new imaging data sets, and so the model is readily transferable. The researchers demonstrate that DeepLoc offers improved determination of protein subcellular localization in yeast relative to existing tools. They also validated that the tool works on data sets that are from different screens than those used for training.

Kraus, O.Z. *et al*. *Mol. Syst. Biol*. **13**, 924 (2017).

MOLECULAR BIOLOGY

Building a better TRAP for translation

Some cell types cannot be easily dissociated from their tissue contexts, making it difficult to determine their molecular profiles. The translating ribosome affinity purification (TRAP) method provides one way to profile nascent translation from a targeted cell type. In the mouse, TRAP consists of a bacterial artificial chromosome (BAC) that expresses EGFP-tagged ribosome protein L10a from a chosen promoter, allowing the recovery of cell-type-specific polysome-bound mRNAs from whole-tissue homogenates. Nectow *et al*. now make TRAP more flexible by dropping the requirement for BAC-engineered mouse strains. The researchers generated Cre-dependent adeno-associated viral (AAV) vectors that express EGFPL10a, which can be used to infect into any mouse strain expressing a cell-type-specific Cre driver. As a demonstration of its versatility, the new viral TRAP (vTRAP) method was used to capture translational profiles in brainstem, hypothalamus and cortex.

Nectow, A.R. *et al*. *Cell Rep*. **19**, 655–667 (2017).

NEUROSCIENCE

Electrophysiology in intact *Caenorhabditis elegans*

Measurements of electrical activity in small organisms such as *C. elegans* or *Drosophila* larvae require invasive preparations. Gonzales *et al*. describe a microfluidic device that allows measuring the activity of body wall muscles in *C. elegans* in the intact animal. The device harbors nanoscale suspended electrode arrays (nano-SPEARs) that are tightly pressed against the animal. The individual electrodes are thin enough to record the activity of only one or a few cells. The researchers apply their device to assess muscle-cell activity in worms expressing channelrhodopsin in motor neurons, in mutant worms with defects in action potential formation or in models of neurological diseases at high throughput. The device is versatile enough to be adapted to other small organisms such as Hydra.

Gonzales, D.L. *et al. Nat. Nanotechnol.* http://dx.doi.org/10.1038/nnano.2017.55 (2017).