TOOLS IN BRIEF

BIOINFORMATICS

Introducing Vesiclepedia

A variety of cell types produce and release extracellular vesicles (EVs) into their local environments. EVs have been found to play an important role in intercellular communication and pathogenesis. Despite the growing interest in studying EVs, it has been difficult to retrieve information about their molecular components, which may include proteins, lipids and RNAs. A large group of researchers from 53 different laboratories (Kalra *et al.*) is seeking to rectify this situation by introducing Vesiclepedia, an online, community-annotated compendium of molecular data from more than 300 independent studies of EVs (http://www.microvesicles.org/). All classes of EVs are included, including apoptotic bodies, exosomes, large dense-core vesicles, microparticles and shedding microvesicles. Users can query molecules of interest or browse by organism, vesicle type, molecule type or sample type.

Kalra, H. *et al. PLoS Biol.* **10**, e1001450 (2012).

SEQUENCING

Genome assembly for kids

The domestic goat may not evoke luxury, but its fine underhair is what is spun to make the prized fibers of cashmere wool. Dong *et al.* now boost the animal's status by endowing it with a sequenced genome. The lack of a reference sequence made it challenging to piece together short reads from the DNA of a Yunnan she-goat. Optical mapping can generate scaffolds that connect shorter stretches of overlapping sequence, but this process is laborious and limited to small genomes. Dong *et al.* automated the process by constructing a chip-like channel formation device used to physically stretch, cut and image DNA, generating 100,000 single-molecule restriction maps that were then combined with partially assembled sequence reads. The device enables optical mapping for the assembly of large genomes.

Dong, Y. *et al. Nat. Biotechnol.* **31**, 135–141 (2013).

MICROSCOPY

Deep, deep *in vivo* imaging

Optical imaging of living biological tissues is largely limited to superficial layers because of scattering. Even with two-photon excitation (2PE) microscopy, it is hard to image beyond a depth of 500 micrometers using the standard two-photon laser wavelength. A trick shown to work some years ago for increasing depth penetration was to use longer excitation wavelengths—but the signal-to-noise ratio when imaging deep-lying structures was still rather low. Horton *et al.* now combine the use of long excitation wavelengths (1,700 nanometers) with three-photon excitation (3PE) microscopy. Using this approach, the researchers performed *in vivo* imaging of the mouse brain vasculature to a depth of 1,400 micrometers and imaged red fluorescent protein–labeled neurons within the hippocampus. The use of 3PE improves the signal-to-noise ratio over that of 2PE, and it is compatible with standard dyes and fluorescent proteins.

Horton, N.G. *et al. Nat. Photonics* advance online publication (20 January 2013).

LAB-ON-A-CHIP

Microfluidics on ice

Organisms that live in extremely cold temperatures express antifreeze proteins (AFPs), which bind to ice crystals and inhibit their growth by driving a difference between the melting and freezing temperatures of ice. The detailed mechanism of action of AFPs has not been determined because the interactions between such proteins and the ice-water interface pose great experimental challenges. Celik *et al.* report a microfluidic device that incorporates a sensitive temperature-controlled system and allows removal of GFP-tagged AFPs from the solution surrounding individual ice crystals without perturbing the ice or changing the temperature. The device allowed them to observe that the binding of AFPs to ice is irreversible and inhibits ice growth even when AFPs are depleted from the surrounding solution, in contrast to the mechanism that had been previously suggested.

Celik, Y. *et al. Proc. Natl. Acad. Sci. USA* **110**, 1309–1314 (2013).