Recombinant RNA

RNA is so much more than just the messenger between DNA and protein; RNA molecules also regulate transcription and have a role in controlling translation, to name only a few of its tasks. To investigate RNA’s structure and function in detail, one needs large quantities of pure RNA species, which are difficult to obtain with present in vitro synthesis methods. Dardel and colleagues now devised a technique that facilitates the production of large amounts of correctly folded RNA inside a cell by incorporating the RNA of interest into the scaffold of a cell’s own highly structured RNA molecule. The foreign RNA is thus protected from intracellular digestion and can easily be purified. They also present ways to separate the newly produced RNA from the scaffold.

Article p571, News & Views p547

Ultrasound on fish

Zebrafish is now recognized as an important animal model for human cancer. Fish neoplasms develop in all tissues, and are morphologically and genetically similar to those seen in humans. In opaque adult fish, however, identification of tumors requires histological examination, which necessitates killing the fish and prevents longitudinal studies. Zon and colleagues now show that high-resolution ultrasound imaging can be used to noninvasively identify and characterize zebrafish tumors that are not detected visually. They monitored tumor progression and response to test therapeutics over time, and were able to use ultrasound to guide needle aspiration of tumor tissue for subsequent analysis. The use of ultrasound is likely to advance the zebrafish as a model for human disease.

Brief Communication p551, News & Views p547

Sweet methods for studying glycosyltransferases

Many glycosyltransferase enzymes carry out the process of glycosylation, perhaps the most complicated of the post-translational processes. Determining the precise specificities of these enzymes is quite difficult owing mainly to the analytical challenge of determining which specific reaction site on a substrate bearing multiple sites is recognized by which specific glycosyltransferase. Providing aid for this effort, Narimatsu and colleagues present a method using position-specifically isotope-labeled substrates, called isotopomer assemblies, for the fine characterization of glycosyltransferase specificity. Using tandem mass spectrometry, they can assign precise structures for positional glycan isomers and identify the reaction sites of sugar transfer. They demonstrated the method for the characterization of five β4-galactosyltransferases.

Article p577

Finding motifs in ChIP

Chromatin immunoprecipitation (ChIP) selectively enriches DNA fragments that are bound to regulatory proteins, such as transcription factors. Analyzing these fragments by DNA microarrays or high-throughput sequencing yields a plethora of information that requires computational methods for analysis. Wittbrodt and colleagues now add a new motif-discovery algorithm called Trawler to the arsenal of computational tools. Trawler can rapidly screen large amounts of ChIP data for over-represented motifs, and displays known protein binding sites and new motifs along with their features in a user-friendly web interface.

Brief Communication p563

Watching mitochondria move

Transport of neuronal mitochondria through axons is important for many functions, and disruptions in this process may be linked to neurological disease. Axonal transport has so far been studied mainly in cell culture, where the in vivo neuronal architecture and cellular milieu are not reproduced. Lichtman and colleagues present tools for studying axonal transport of mammalian mitochondria in acute explants and in living mice. They generated and characterized transgenic mice expressing mitochondrial targeted fluorescent proteins in neurons, and used transgenic lines with no apparent functional defects to carry out imaging on single cells in vivo, in both intact and transected nerves. This approach will be useful for the study of mitochondria in normal physiology and disease.

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