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Triple helices

Triple-stranded DNA structures have attracted a lot of attention in the past few years, particularly with the view to developing strategies for specific recognition of double-stranded sequences by a third stretch of synthetic nucleotides. The idea is basically simple, viz. unsatisfied hydrogen-bond donor and acceptor groups that do not participate in Watson-Crick base pairs in the double helix are now available to interact with a third strand by means of Hoogsteen base-pairing schemes. Thus synthetic nucleotides may indeed turn out to be the easiest of DNA-binding molecules to design. The prospects are many, ranging from development of 'chemical restriction enzymes' for specifically fragmenting chromosomal DNA by recognition of rare sequences to design of molecules that can regulate gene expression *in vivo* (A. S. Moffat, *Science*, 1991, **252**, 1374-1375).

Formation of oligomeric triplexes in solution is best monitored by proton NMR spectroscopy. Anup Madan and R. V. Hosur (page 588) describe a 500-MHz ¹H NMR study of the binding of the hexamer dCGCTCT to the self-complementary double-stranded nucleotide, dCAATCTCGCGAGATTG in aqueous solution. The authors demonstrate triplex formation, despite the relatively small size of the third strand, and suggest appreciable stability for these structures.

Mobile receptors

Receptor recycling is a fascinating chapter in contemporary cell biology. The ability of cell-surface receptors to recognize their specific ligands, subsequent internalization of the receptor-ligand complexes, targeting of ligand to endosomes, and final return of the 'empty' receptor to the cell surface, are truly remarkable examples of highly sophisticated biological mechanisms, which display great complexity at the molecular level. The article by Ramesh Hegde (page 555) surveys this active area of cell biology.

The surface structures that attract receptor-ligand complexes as a prelude to endocytosis are the 'coated pits', which contain cage-like assemblies of the protein clathrin. Many questions arise regarding receptor migration into pits. 'Are receptors like escalators' which move even in the absence of passengers (ligands) or 'are they like elevators' which require buttons to be pushed by passengers? The weight of experimental evidence appears to favour the escalator analogy. The author reviews current ideas on the assembly and disassembly of coat proteins and the role of adaptor proteins. Trafficking to the endosome, receptor-ligand dissociation and the ability of endosomes to maintain acid pH play important parts in the recycling story. It is only nine years since the discovery of a special compartment, christened CURL, where

receptor-ligand dissociation takes place. Presumably, there is more to come.

Copying immobilized DNA

DNA is usually present as a double-stranded molecule. The complementary nature of the two strands allows the synthesis of one strand using the other as a template. This principle is often used to generate radioactive probes specific to a given stretch of DNA sequence: If the synthesis of the complementary strand is done by incorporating radio-labelled precursors, then the new molecule synthesized will be radioactive. Such radioactive probes can be used to 'search' for the complementary strand in other situations, for example the screening of a library of DNA clones. R. Maitra and A. R. Thakur (page 586) describe an elegant method of synthesizing labelled DNA in a situation where the template for synthesis is limiting. They show that DNA can be bound to glass and used as a template for synthesis. Such a glass-bound template can be used repeatedly. This method should be useful in forensic studies, experiments with fossil DNA, and other situations in the molecular-biology laboratory where template DNA is limiting. It also offers several applications along with use of the polymerase chain reaction (PCR).