

Helical twister storms world



DNA, Mitsuko Hoshino, 2000

This journal raises a toast to the golden jubilee of the double helix. The completion (well almost) of the human genome sequence this year adds a gratifying counterpoint to this the most prominent biological discovery of the last century.

Although all the pieces of the DNA structure puzzle had already fallen into place by this time fifty years ago, and although the set of three papers by Wilkins, Franklin, Watson, Crick and colleagues were already in press at *Nature*, it was not until late April that this information was unleashed on the world. Not that the elegant helical twists of DNA generated the expected flurry of research activity and recognition for some years to come, as Watson likes to point out. However, others were waiting even longer with equally towering milestones further up the road: nine years previously, Avery, MacLeod and McCarty had laid the foundation with their identification of DNA as the 'transforming principle' of *Pneumococci*. This extremely laborious experiment showed that DNA carries genetic information. The concept seemed so difficult to rationalize at the time that this work received little attention until long after the Watson and Crick paper was published, which incidentally also refrains from citing the work.

Equally, the sizeable number of groundbreaking findings that resulted from this work, such as the code, sequencing, semi-conservative replication, transcription, translation, restriction enzymes and repair, to name but a few, continue to receive relatively modest individual attention to this day. So why is it that the DNA structure in particular has crystallized out as the premier icon of biological scientific discovery? A good part of the answer is undoubtedly the elegance of form and function of the double helix itself: the logic for replication was immediately recognized, making DNA a great 'choice' as the carrier of genetic information. Furthermore, the discovery was one with all the hallmarks of a bestseller: the eureka moment of base-pairing, double helix and the potential to replicate, the race to the finish, the star line-up of enticing characters and, undeniably, a good sprinkling of intrigue.

The aesthetic and intellectual elegance of the double helix is undoubtedly a fitting icon for biology and it must be a good sign that these days one finds it on the covers of fashion magazines, perfume bottles and in art galleries (even if all too often left-handed).



Polar expedition

This month, we showcase in a series of articles the diverse set of cell biology fields that are united in the study of cell polarity. Polarity lies at the heart of development in all organisms and at all levels, from the intrinsic polarity of the one-cell embryo to the establishment of tissue polarity through to whole-organism asymmetry. Early microscopy studies unveiled the diversity of cell shapes and it quickly emerged that all eukaryotic cells are composed of numerous organelles orientated in a highly asymmetric manner. That this asymmetry was key to cellular function emerged later, as more was learnt about how, for example, nascent proteins move between organelles. Now, after over a century of cell biology, it is increasingly clear that variety is the spice of life. Each cell is polarized in such a way as to ensure its adaptation to its particular role. Polarity occurs at different levels: the true extent of membrane polarization in epithelial cells, for example, is only evident when the molecular composition of the apical and basolateral membranes are compared; whereas in neurons, the highly polarized morphology of the cell body, dendrites and extended axon are immediately striking. Equally, polarity can be a permanent cellular feature or a highly dynamic process, as is evident in cell migration. With the advent of techniques allowing functional analysis and *in vivo* imaging, it has become possible to analyse not only where factors are localized within the live cell, but also to ask how they get there.

To ensure all cell biologists can access these articles, the April issue will be free online for one month. A continuously updated *Focus on Polarity* web resource complements this special issue by providing archival access to all relevant articles within NCB. We would encourage your feedback on these Focus sites. □