nature insight

computational biology

This Insight presented us with a difficult problem, not in its content — a collection of reviews showing how sophisticated mathematical concepts have illuminated and continue to illuminate the principles underlying biology at a genetic, molecular, cellular and even organismal level. The problem was what to call it.

There is considerable interest in this sort of biology at the moment, with well-funded centres springing up at a number of prestigious universities. Most commonly it is referred to as 'systems biology', relating it to systems engineering. But such a term is far too all inclusive, as when biology ceases to concern itself with the 'systems' of organisms it ceases to be biology and becomes instead a subdiscipline of chemistry or physics.

Equally 'Mathematical Biology' or 'Quantitative Biology' didn't fit the bill, as quantitative measurements and their mathematical and statistical manipulation underlie science as a whole. Someone suggested 'Holistic Biology' or even 'Whole-istic Biology', but saner council prevailed.

We also did not want a name that implied that this was a new topic. Physiologists have been looking at the functioning of organisms as a whole for decades, if not centuries. Applying network analysis to cell signalling, metabolism and genetics features heavily in the Insight, but Stuart Kauffman and others were pioneering such approaches in the 1960s. As far back as 1902, Theodor Boveri tested the chromosomal theory of inheritance with probabilistic simulations.

In the end we concluded that the unifying strand that runs through all the work described in this Insight was computation, whether it be the production of sophisticated models against which reality is compared, or the subtle analyses that derive patterns and trends from vast and noisy data sets. There are other themes running through the reviews in this Insight, more than you might expect from the titles alone, but 'Computational Biology' it has become.

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Christopher Surridge **Senior Editor**