

ply large. The publishers might start thinking of splitting it into two or three, say on behavioural and genetic studies, one on cellular neuroscience and yet another on cognitive and systems neuroscience which is perhaps the way it will soon be. But I do hope they do not do so because the charm of *Annual Review of Neuroscience* has been the very breadth of its coverage. I hope they keep up this spirit even when growing. It seems like it took three years in the making and so some reviews are perhaps outdated, but still very useful. It will however be nice to review outstanding research in the calendar year, in addition perhaps to a specific write-up, just to bring to notice a few most outstanding papers and techniques that appeared in neuroscience journals or are relevant to neuroscience in the year or an 'Editors' Choices of the Year' section.

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The era of genomics has brought with it an onslaught of information. It is now up to the biologist to make sense of the reams of computer-generated data that make up the 'Book of Life'. The fast-expanding tome has no chapters explaining how things work at the level of the intact cell or the whole organism. Unravelling these mysteries requires a solid foundation in the basic principles of cell and developmental biology. The 17th volume of the *Annual Review of Cell and Developmental Biology* (2001) with an impressive list of editors, has done a fair job of choosing a varied blend of topics in the field of cell and developmental biology, ranging from the classical problems of cytokinesis, somatogenesis and patterning, to the current trends in stem cell biology.

What has always escaped me when browsing through the *Annual Reviews*, is the reasoning behind the haphazard arrangement of topics and the unwillingness of the editors to group them into categories wherever possible. For example, it would be logical to place chapters on vertebrate limb development, eye development, somatogenesis, left-right asymmetry and patterning sequentially, rather than interspersed with unrelated topics. The same holds good for chapters highlighting the amalgamation of chemical and biological strategies to study a given system, or chapters related to plant biology. Having said that, the content of the individual chapters is generally well-organized and in a format which makes reading enjoyable.

Excellent reviews on some popular topics in cell biology such as 'Animal cell cytokinesis' (by Glotzer), 'How matrix metalloproteinases regulate cell behaviour' (by Sternlicht and Werb), 'Biological basket-weaving: Formation and function of clathrin-coated vesicles' (by Brodsky *et al.*) and 'Getting the message across: The intracellular localization of mRNAs in higher eukaryotes' (by Palacios and St. Johnston) remind one of the awe-inspiring processes within a cell that we understand little about, but take for granted. This feeling is renewed by the chapters on 'Peroxisome biogenesis' (by Purdue and Lazarow) and 'The molecular basis of sister-chromatid cohesion' (by Lee and Orr-Weaver). The account on thrombospondins (by Adams) leaves a lot to be desired as it gives an assimilation of facts and little insight, making it hard to sustain the reader's interest. The chapter on cellular functions of PI3 kinase by Katso *et al.* highlights the importance of studying molecules in the context of normal development as well as in diseased states. Two chapters are devoted to plant development. The review on polarized growth in plants, while adequate, could be made more interesting by a brief comparison to polarized growth in animals. The authors have made good use of illustrations to hold the reader's interest and explain basic concepts and experimental data on seed development.

The inclusion of five chapters on classical problems in developmental biology ('Patterning mechanisms controlling vertebrate limb development' by Capdevila and Izpisua-Belmonte; 'Boundaries in development: Formation and Function'

by Irvine and Rauskolb; 'Early eye development in vertebrates' by Chow and Lang; 'Vertebrate somatogenesis' by Pourquie and 'Left-right asymmetry determination in vertebrates' by Mercola and Levin) reveals how little we know of these basic developmental processes, in spite of decades of analysis. All the five chapters are excellently organized and edited and do justice to the current overload of information available in these areas of research. The limb bud has been a favourite model of developmental biologists for decades because of the ease of manipulating this structure in the chick and the informative assays one can devise to study it. The authors start with a detailed introduction of the model, assimilating a plethora of information available on patterning and finally put it in the context of evolution. This makes an understandably long chapter, which should be of use to the novice as well as the experienced researcher.

The account on early development in vertebrates by Chow and Lang generates interest because, in addition to the expected details on eye development, the authors address the issue of generating two eyes from a single eye field and discuss the conservation of genes specifying eye development between vertebrates and *Drosophila*. The chapter on 'Vertebrate somatogenesis', in addition to discussing more genes and pathways involved in segmentation, introduces the concept of the segmentation clock, which controls the intrinsic determination of the segmentation programme. The book also highlights this emerging concept in developmental biology by devoting a chapter to the 'Molecular bases of circadian rhythms' (Harmer *et al.*).

Cell and developmental biology is no longer the domain of the biologist alone and three chapters highlight the importance of having both chemical and biological approaches to understanding biomolecular function. The chapter on 'Recent advances in chemical approaches to the study of biological systems' by Shogren-Knaak *et al.*, is a good starting point for the reader seeking an introduction to this concept. With several examples of chemical approaches, the authors bring out the shortcomings of classical genetics methods and discuss how forward chemical genetics can be used to overcome these. For example, we learn how protein-protein interactions can be influenced in a controlled manner

chemically, rather than by generating mutant alleles using genetic methods. Synthetic approaches to generating novel biomolecules are also explained.

At present, it seems as if no issue of any major publication in the biological sciences can avoid the mention of stem cells. This volume has rightly devoted only two chapters to this area, describing the derivation and intricacies of only the two well-studied and established stem cell types, namely embryonic stem cells and haematopoietic stem cells. Weissman *et al.* present an authoritative review on the haematopoietic stem cells and have lucidly explained the confusing biology of various derivatives and their implications for therapy ('Stem and progenitor cells: Origins, phenotypes, lineage, commitments and transdifferentiation'). In the chapter on 'Embryo-derived stem cells: Of mice and men', Austin Smith gives a no-frills account of embryonic stem cell biology, the current scenario, and highlights the fact that most stem cell-based therapies are only potential to date. Thus the need for basic stem cell research is the order of the day, as we have only limited control over the outcome of stem cell differentiation.

This volume is a good reference for professionals, as it deals with a wide range of topics that are of current and classical interest. Additionally, students seeking an introduction to simple principles that can be applied to various analyses of cell function and developmental systems would also find this volume useful.

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The Health of Nations: Infectious Disease, Environmental Change and their Effects on National Security and Development. Andrew T. Price-Smith. The MIT Press, Cambridge, Massachusetts. 2002. 220 pp.

During the later half of the twentieth century revolutionary developments in vaccinology, discovery of a series of

antibiotics and improvement in public health measures in the developed countries resulted in an euphoria that the war against infectious diseases was nearly won. Thus in 1969, the US Surgeon General William H. Stewart is reported to have remarked that 'it was time to close the book on infectious diseases'. It was believed that the means of controlling most of these diseases was either available or discoverable without undue difficulty. This feeling was strengthened by rapid advances in molecular biology and biotechnology. The sudden emergence of HIV/AIDS epidemic in the early 1980s provided the rude reminder that microorganisms, which have antedated human evolution by several millennia, are biologically quite powerful to be dismissed so easily. Thus, at the dawn of the new millennium, infectious diseases remain the most common cause of death in the world. We are witnessing an emergence of a variety of new infections – more than 30 new and highly virulent infections having been identified in the last 20 years. These include Hanta virus, Ebola-type haemorrhagic fever, hepatitis C, *Campylobacter*, Lyme's disease, etc. Simultaneously, there has been a re-emergence of well-known diseases like malaria, tuberculosis, cholera and leishmaniasis, not only in the developing countries, but in several developed ones also. Notwithstanding all disease surveillance and health-care services, a defect in a large municipal water supply system resulted in infecting more than 400,000 people in Milwaukee with *Cryptosporidium parvum* not very long ago. Notified cases of food poisoning were 100,000 in the UK in 1997. The recent episode of 'mad cow disease', though affecting only a small number of persons, caused huge economic losses and slaughter of millions of cattle.

It has been generally believed that poverty and underdevelopment predispose to infections, and large-scale infections like the pandemics of plague or influenza in the later part of the 19th and early 20th century or the current HIV/AIDS epidemic can have detrimental effect on state economy. However, the book under review has attempted to provide an empirical evidence to support these presumptions. At the same time it has brought into focus a new dimension rarely studied by biomedical scientists, i.e. the inter-relationship between the emerging and re-emerging infectious

diseases (ERIDs); State capacity which refers to the capability of the government to maximize its prosperity and stability, to exert *defacto* and *dejure* control over its territory.

The author has attempted to understand the causal role that disease plays in determining state capacity and the causal relation between the two variables. For this purpose the author has collected data from 20 countries extending over a period between 1950 and 1991 on indicators for ERIDs on one hand, and state capacity on the other. These include Botswana, Brazil, Colombia, Ethiopia, Haiti, Iceland, India, Italy, Japan, Kenya, Malawi, the Netherlands, Norway, Peru, Rwanda, Saudi Arabia, South Africa, Tanzania, Thailand and Uganda. It must be pointed out that instead of precise data on incidence and prevalence of various infectious diseases, the author has chosen some selected indirect indicators like infant mortality, life expectancy or both. These have been correlated to gross national product, government expenditure, military spending, secondary school enrolment and net long-term capital inflow as indicators of state capacity. Besides studying these correlations at the national level, similar analysis is carried out at regional and global levels. On the basis of this analysis, the author confirms that the increasing prevalence of infectious diseases will increase human mortality and morbidity, resulting in gradual erosion of state capacity and in increasing poverty. Because of this relationship, pathogen-induced economic decline will increase the demands of population on the state for the provision of basic services, even as the ability of the state to provide those goods and to govern effectively declines similarly. It was observed that the balance of the evidence suggests that increasing human-induced degradation of the planet's ecological system may accelerate the emergence of pathogens, promote recrudescence, alter the spatial distribution of pathogens, and make pathogens more virulent. The study establishes linkages between infectious disease and state capacity in terms of fiscal resources, resilience, reach, responsiveness, autonomy and legitimacy. It indicates its influence on perpetuation and even exacerbation of poverty and in certain cases, political instability. ERIDs were found to have a negative effect on such measures of state capacity as fiscal resource, resilience, reach and respon-