Understanding cancer

The Biology of Cancer

by Robert A. Weinberg

Garland Science: 2006. 796 pp.

£89.99, \$140 (hbk); £41.99, \$99 (pbk)

Chris Boshoff

Every cancer researcher knows 'The hallmarks of cancer', an iconic review by Douglas Hanahan and Robert Weinberg (*Cell* **100**, 57–70; 2000) that outlined the principles of tumour development: self-sufficiency in growth signals, insensitivity to antigrowth signals, evading apoptosis, limitless replicative potential, induction of angiogenesis, invasion and metastasis. In *The Biology of Cancer*, Weinberg has expanded these hallmarks into an alluring text. He takes us on a journey from the pioneering days of Gregor Mendel and Peyton Rous, to the latest insights in understanding how tumours become resistant to targeted therapy.

The book comes laden with expectations, mainly a result of Weinberg's reputation as a cancer biologist and a teacher. The author has borne the weight. Each chapter unfolds as a fascinating tale, from the historical perspective, through key experiments, to interpretation and future challenges. A striking example is the section on the inhibition of pancreatic cancer and medulloblastoma growth (through targeting of the signalling protein Hedgehog), which starts with the story of sheep flocks grazing on corn lily. Their offspring developed malformations including cyclopia, which led to the isolation of cyclopamine and the eventual discovery of mutations in the *patched* and *sonic hedgehog* genes, and new analogues of cyclopamine that inhibit these. The tumour's microenvironment (including the interactions between the seed and the soil) is discussed in detail and becomes an independent hallmark of cancer, along with immunoediting, the crosstalk between tumour niche and host immunity. Weinberg's own laboratory linked the master regulators of certain processes of development (Slug and Twist) to cancer metastases. The insight obtained from processes involved in mammalian development is a recurring theme throughout the book.

In a book of this scope, some readers will inevitably feel disappointed. For example, those studying the bioenergetics of tumour cells will not find a reference to Otto Warburg or discussions about alterations in glycolytic pathways and mitochondrial respiration during tumorigenesis. Epigenetic changes in cancer are covered cursorily, and the book only touches on certain emerging fields such as the role of microRNAs in tumour development, diagnosis and classification, and the mechanisms by which autophagy (a vacuolar process of cytoplasmic degradation) contributes to oncogenesis. These are merely observations, not an indictment.

To get a good idea of the magnitude of this

Taking over: a transplanted sarcoma (on the right) has developed an unruly vascular system.

R.D. ACLAND & G.L. ANDERSON, UNIV. LOUISVILLE

book, the reader must look beyond the imagery and illustrations, and read the numerous vignettes highlighted throughout the text, as well as the supplementary sidebars provided on the accompanying CD-ROM. Here Weinberg demonstrates the breadth of his understanding and insight, and discusses the problems still facing us. For example, if micrometastases are attracted to an environment where they can flourish, why are recurrences of renal cancer not centred on the other kidney? How do we overcome the elevated interstitial pressure inside tumours, which has bedevilled attempts to deliver therapeutics effectively? Furthermore, despite the promise of mechanism-based therapeutics and pharmacogenetics, the best predictor of survival after treatment of lung cancer with an anti-EGFR inhibitor is still smoking status.

There is no comparable text in cancer biology and no single book that is so current and

informative. Weinberg was ably assisted by an artist, Nigel Orme, in translating complex concepts into imaginative illustrations.

I would recommend the hardback copy: my soft-bound version came apart after one week of bed-time reading.

Although the book's stated intention is "to stimulate a new breed of cancer researchers", there is much here even for scholars to learn or be reminded of. Most molecular- and cell-biology students are familiar with *Molecular Biology of the Cell*, edited by Bruce Alberts and colleagues, now in its fourth edition (Garland Science, 2002). In a similar way, I hope that professionals and students in all spheres of cancer research will get to know *The Biology of Cancer*. ■

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Detecting hidden objects

Seeing Spatial Form

by Michael R. M. Jenkin & Laurence R. Harris

Oxford University Press: 2005. 449 pp.

£38.99

Manfred Fahle

Seeing Spatial Form covers an apparently eclectic mix of topics in visual perception, from 'pictorial relief' and 'vision in flying' to 'neuronal damage' and 'dopamine receptors'. In the introduction, the editors, Michael Jenkin and Laurence Harris, relate these and other seemingly disparate themes to the general topic of 'spatial form' — the detection of (often hidden) shapes in the visual world. In my view,

detecting objects' shapes in the enormous complexity of retinal signals is one of the most elaborate feats achieved by the human brain. One excellent example of this feat is the detection of camouflaged items, which is proving a tough problem for artificial intelligence.

The book does not provide a systematic treatment of the perception of spatial form in vision, so how did the editors decide what to include? They were guided by three principles: the choice of first-rate contributors; the adoption of a systems-analytical and model-driven approach; and the desire to select topics close to David Martin Regan's heart. This is because the book is a *Festschrift* in honour of Regan's 68th birthday. So, instead of an integrated,