my whole thesis research and got me launched as a person who can think independently and do something on her own. I'm not sure it was my best idea scientifically, but it was the best in terms of career changing.

Which scientific idea (yours or others') do you regret the most?

The worst thing I have done is also the best thing I have done. It's a pattern of behavior I have – I like to do lots of different things. In my research, we've found many interesting problems and uncovered lots of interesting phenomena, but then I wound up moving on to further things that interested me. So I never finish sorting out certain problems. I'm sad that several really interesting phenomena we've discovered remain unanswered questions. Some ideas have been picked up by other laboratories, but I regret that, several times, I've gone off and been too dazzled by something else.

On the other hand, I think I also benefit from this behavior. Because I've worked on several different organisms and several different problems, I think about things in ways that I would not otherwise have done had I just focused on one or two problems. It's my personality structure. I take the good with the bad.

What are your scientific plans for the next five years?

My plans are to keep my eyes and ears open. My work has changed so much in the past five years that it would be impossible to predict the next five. I think that, in general terms, I am more interested in problems very different to those I was interested in earlier in my career.

Currently, I am interested in how the mechanisms of protein folding can shape evolutionary processes. This is something that really hasn't been thought about in evolutionary terms before – we've been concentrating on DNA sequence analysis. The problem of protein folding will have a very important influence on our ways of visualizing and thinking about evolution.

I'm also very interested in using yeast cells as a system for studying some really devastating human diseases. My research has always been very basic, with some general idea that maybe some of the things we might discover would lead to things that could help people. I have this humanitarian instinct! Right now I'm more focused on establishing model systems that can really help people afflicted by neurodegeneration. And I think it will be tremendously satisfying to make a contribution directly.

The third area that I'm interested in is nanoscale assembly and the use of biological materials for materials-science applications. We have found that prions form self-seeded fibers. Because we work with yeast, we can use yeast genetics to modify the properties of those fibers. I think we will find a really interesting avenue for constructing structures on a nanoscale level and that these could have novel properties. We have just started on this, but I'm really interested.

What are the qualities of a successful researcher?

One must not only be willing to accept criticism but anxious to get it. At the outset of my career, I was insecure, and, when people criticized my work, it was hard. But I came to realize that the criticism was vitally important for making me do my own soul-searching. Was I right or wrong in my thinking? Or had I just communicated it so poorly that I was being misinterpreted? I've come to be not only open to criticism, but to actively seek it out – in a constructive spirit of course. I've had papers reviewed with an underlying mean tone that just seems unnecessary. But rigorous analysis and criticism is always very helpful. It stimulates you to think in novel ways and to communicate more effectively.

'What more extraordinary question could there be in the history of mankind than: 'What is life?' And here we are, discovering what it is.'

There are lots of different reasons to get into science. It's hard work and you have to go through a lot of difficult times – so it only works well if you are really passionate about what you're doing. And I really do love science. I find it so amazing. Not just my own work of course – but what everyone else is discovering too. That sense of pure exhilaration about new ideas and explorations is perhaps the most important quality for a researcher to have.

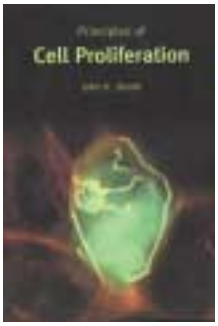
The intellectual discovery of life is just extraordinary. Going back to that fifth-grade lecture, what more extraordinary question could there be in the history of mankind than: 'What is life?' And here we are, discovering what it is. I think it's fantastic.

Susan Lindquist was interviewed for BioMedNet by Anne Jacobson.
Adapted from a 'Conference Reporter' feature published online on BioMedNet (http://news.bmn.com/conferences/).

Book Review

Bon appétit with cell proliferation basics

Principles of Cell Proliferation
By John K. Heath. Blackwell Science Ltd, 2001. £22.50 pbk (137 pages)
ISBN 0 632 04886 7



This is one of those books that, in a bookstore, you might just grab *en passant* because of its modest length and appetizing layout. From the first page, the writing style is enthusiastic, and the preface amusingly and honestly states: 'One of the most beguiling features of science is that you never truly understand anything. Be warned Reader! – there are numerous unanswered questions lurking in these pages and many confident statements that will soon be rendered irrelevant by new developments'.

The book is dedicated to the author's personal scientific hero Robert Holley. Using NIH3T3 cells, Holley and colleagues established 30 years ago that there was a correlation between the number of cell doublings possible *in vitro* and the amount of serum present in the cell culture medium. These observations were the basis for the first purification of

growth factors. The nine chapters are structured into three major topics. To explain the logic of cell proliferation, an outside-in approach is used where one first learns about the extracellular growth factors and then at the end reads how genes get expressed subsequent to receptor activation and intracellular signaling. These processes feed into and control the cell cycle, and this links to the last section, which concerns control of cell death (apoptosis) and also gives an account of how some genes are tumorigenic (oncogenes) and others function as tumor suppressors.

It is nicely stressed throughout the book that most of the signals regulating cell proliferation exert their effect during the beginning of the cell cycle (G1), before the cell becomes committed to mitosis. I personally enjoyed the section on TGFβ, which, unlike the other molecules discussed, can be an inhibitor of cell proliferation and also is required for deposition of the extracellular matrix. A dramatic photo illustrates a Belgian Blue bull, a breed with a naturally occurring inhibitory mutation in a TGFβ family member (myostatin), which as a result displays a characteristic 'double muscle' phenotype.

A good section explains the four kinds of receptor types involved in cell proliferation: the receptor tyrosine kinases, the cytokine receptors, the TGFβ receptors and the seven-transmembrane family of receptors. Signal-transduction pathways and subsequent effects on gene expression are nicely and simply discussed. It is explained that oncogenes can be virtually any gene involved with cell-cycle regulation, and a protein expressed from an oncogene makes a cell capable of cell multiplication in the absence of growth factors. In the section on tumor-suppressor genes, the classical retinoblastoma, p53 and p21 pathways are explained. The section on apoptosis is strong and stresses that apoptosis is a programmed event and not some random process a cell goes through when it dies.

I have some points of criticism of the text. It is disturbing for the flow of text that the atomic structure of many of the molecules is described in the text. It would have been clearer to leave this out or to have dedicated one chapter to a comparison of atomic structures and to a discussion of how kinases and receptors are thought to be activated and regulated at the atomic level. Sometimes, the style is so colloquial that the message is awkwardly or incorrectly conveyed. For example: 'Can it be possible that it is the transcriptional induction of D-type cyclins in G1 phase that starts the mammalian cell cycle engine? The correct answer to this question is "perhaps".' (p. 89) or 'The abnormal cells in question are transformed cells and the biochemical mechanisms to be revealed are oncogenes.' (p. 92). There is a mistake in the figure and text concerning the effect of mating factors on the cell cycle of budding yeast. The presence of mating factors arrests the cell cycle prior to the mating process, and does not cause sporulation, as stated (p. 87).

The book is intended for beginners in the field, who have some background in molecular biology, and I think the book targets this audience nicely. Most other readers would find the book inadequate, but there are some interesting angles and anecdotes buried in the text that any reader would value and find amusing.

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A guide to the sections of *Trends in Cell Biology*

Research Update

features Research News articles, succinct mini-reviews giving expert and balanced interpretation of important recent advances. Meeting reports and updates on new techniques are also included in this section.

News & Comment

contains the Journal Club – short commentaries highlighting important recent papers in cell biology written by a diverse panel of active scientists – and also In Brief news, offering a glimpse of interesting developments in policy, funding, legal and ethical issues etc., of relevance for cell biologists. Letters about articles in the journal or any issue of general interest to cell biologists are welcomed for publication in this section.

Opinion

provides a forum for personal viewpoints on research topics, including discussion of controversial or developing themes, and models or hypotheses.

Review

articles form the core of the journal, providing authoritative, timely and objective coverage of important developments in cell-biological research.

Forum

contains lighter reading, such as book and software reviews, and Pioneer, Career Perspective and Profile articles.