

BioTechPrimer/Burke, Emily – The Biotech Primer

BioTech Primer Inc., 2012, [Business] Grade ★★★★★

If one takes a step back and looks at the evolution of biotechnology the last 3 - 4 decades, it has been a breathtaking journey of bringing impressive scientific discoveries to the areas of health care, agriculture and industry. This primer focuses mainly on biomedicine and the life science biotech industry. The BioTechPrimer Corporation offers training sessions in biotechnology, often to a non-scientist audience and is as such well suited to explain this perhaps somewhat unintelligible topic to a broader audience. The main author Emily Burke, Ph.D. who has a long career in the biotech industry, is the director of curriculum for the organization and teaches several of its courses. The text could have benefited from a more formal introduction of this main author. As it is now, Burke's name is only shortly mentioned in a passage of the publisher's acknowledgments.

Apart from the introductory chapter the book has two main parts. Chapters 2 – 5 plus chapter 7 gives an introductory course in human biology, at least the parts the size of molecules and cells. Then chapter 6 and 8 – 10 describes how a biologically cultivated drug functions and is developed into a commercial product. The text is well written, the storyline is logical and enlightening and there are numerous excellent explanatory illustrations (if only in black and white). Even though it is an introductory primer the text doesn't back away from giving a fair amount of detail and dropping quite a lot of medical terms, instead of just describing topics in a general manner.

The industry standard definition of biotechnology is *the use of cellular and bimolecular processes to solve problems and make useful products*. A large part of those useful products are drugs to treat a wide range of life threatening diseases. In contrast to pharmaceutical drugs that are

chemical - often man-made - small molecule compounds, the biotech equivalent called biologics is made in a cell or a living organism. Because of this the molecules in biologics are generally much larger. On the one hand this means that the drug cannot enter cells directly and has to deliver its effect outside the cell walls. On the other hand the larger complexity of the molecule allows for a much more tailored effect, better targeted at what is being treated.

One of the key breakthroughs in turning our knowledge of DNA into useful drugs was the 1970's discovery of an enzyme in bacteria that could cut DNA strands at particular sequences plus another enzyme that had the ability to glue two loose DNA strands back into one. Through this so-called recombinant DNA technology it became possible to tailor DNA strands with specific purposes and specific traits and have them mass copied – in essence manufactured - in for example bacteria, or animal cells. Most of these DNA strands have large human sections as this allows them to be accepted by the body's immune defense and thus deliver the targeted effect.

This is a book on biology and on drug development and manufacturing. Only some of the business aspects of the biotech industry are covered and it is not a biotech-for-investors type of text. For example, the important industry trait of licensing the products to larger companies that have the marketing muscles is only cursorily mentioned. Still, for any serious investor it is obviously vital to understand the basics of the industries where investments are made. How to form joint ventures and negotiate licensing deals will have to be learnt elsewhere.

So far this is the best non-scientist primer on biotech that I've read. Highly recommended.

Mats Larsson, February 18, 2018