

Preface

Systems biology can be defined as the study of how multiple interacting parts of a living system affect each other. A tumor is a system of cells that is imbedded in a larger system of organs, otherwise known as the human body. This book attempts three things from the systems biology perspective. The first chapter lays out testable reasons why estrogens and macrophages may be mechanisms behind why a lifelong exposure to estrogen increases breast cancer risk. The second chapter clarifies confusion between the cellular plasticity and cell-of-origin hypothesis in describing how tumors arise and how tumors sustain themselves. The third chapter describes common misuses of mouse models of cancer and how a systems biology perspective can extract so much more useful information from mouse models of cancer.

The primary purpose of this book is to provide insightful knowledge and testable predictions for researchers and students within cancer biology. The secondary goal is to provide training material for those who are new to the field of cancer biology. The first chapter will be very informative for researchers who study breast cancer risk and biological mechanisms of that risk. It will also be very useful to researchers who study cellular or molecular aspects of breast cancer and who want to better understand how global physiological mechanisms of normal mammary development and function affect their question of interest. The second chapter provides an example of how to assess two competing theories of tumor development. The third chapter provides concise, insightful guidelines that will bring newcomers to the topic of mouse models of cancer up to speed regarding common pitfalls and ways around them. It will also help veterans of mouse models of cancer to better make sense of their data: past, present, and future.

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Systems Biology of Tumor Physiology
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