# Contents

Contributors ix
Acknowledgements xii
Foreword xiii

1 **Definition: Translational and Personalised Medicine, Biomarkers, Pharmacodynamics** 1
   - Introduction 1
   - Defining Translational Research and Personalised Medicine 2
   - Prognostic Biomarkers 3
   - Predictive Biomarkers 5
   - Biomarker Selection and Validation 6
   - Pharmacodynamics and Drug Development 7
   - Surrogate Endpoints 8
   - Conclusions and Future Directions 9
   - Further Reading 10

2 **Biology of Normal and Tumour Cells (Self-sufficiency and Insensitivity to Anti-proliferative Signals, Apoptosis, Limitless Replicative Potential)** 12
   - Normal Cell Structure 12
   - Normal Cell Properties 14
   - Cancer Cell Biology 19
   - Conclusion 26
   - Further Reading 27
# Principles of Tumour Immunology and Immunotherapy

## Introduction

### Innate and Adaptive Immunity

### Immunosurveillance of Cancer

### Tumour Antigens

### Immune Escape Mechanisms

### Immunotherapy

### Concluding Remarks

### Further Reading

# Classes of Drugs and Mechanisms of Action

## Introduction

### Chemotherapeutics

### Molecularly-targeted Anti-cancer Drugs

### Conclusions

### Further Reading

# Techniques and New Diagnostic Technologies

## Introduction

### High-throughput Technologies for Molecular Genotyping and Their Applications

### Biomarker Identification Through Liquid Biopsy

### Conclusions and Future Perspectives

### Further Reading

# Angiogenesis, Tissues Invasion, and Metastasis

## Introduction

### Physiological and Pathological Angiogenesis

### Tumour-associated Vasculature

### Anti-angiogenic Therapy in Cancer

### Resistance to Anti-angiogenic Therapy

### Biomarkers of Tumour Angiogenesis

### Invasion and Metastasis

### The Metastatic Cascade

### Metastatic Organotropism

---

**Contents**
## Molecular Diagnostics and Biomarkers: Application and Limits

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>113</td>
</tr>
<tr>
<td>Biomarkers: Definition and Subtypes</td>
<td>118</td>
</tr>
<tr>
<td>Molecular Biomarkers: Method Validation and Clinical Qualification</td>
<td>119</td>
</tr>
<tr>
<td>Technical Procedures and Associated Challenges Involved in Molecular Biomarker Development and Analysis</td>
<td>120</td>
</tr>
<tr>
<td>Predictive and/or Prognostic Molecular Biomarkers of Clinical Relevance</td>
<td>122</td>
</tr>
<tr>
<td>Clinical Results</td>
<td>122</td>
</tr>
<tr>
<td>Potential Future Developments</td>
<td>123</td>
</tr>
<tr>
<td>Further Reading</td>
<td>124</td>
</tr>
</tbody>
</table>

## Index

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>125</td>
</tr>
</tbody>
</table>