



Section I

Molecular Foundations of Precision Medicine

INTRODUCTION

The Human Genome

- Chromosomes

- Genes and Genetic Medicine

 - Genetic Variation

 - Single Nucleotide Polymorphisms

 - Research

 - Genome Wide Association Studies

 - Relevance studies

 - Clinical Needs

 - Clinical Benefits

 - Adverse Responses

 - Further Assessment

 - Copy Number Variations

 - Insertions and Deletions

Principles of cell signaling

- A classification system of human cellular responses

- Receptors

- Ligands

- Kinases

- Transcription Factors

- Cell death signaling

Cellular metabolism

- Catabolism

 - Carbohydrate metabolism

 - Protein metabolism

 - Lipid metabolism

 - Nucleic acid metabolism

- Anabolism

- Blood Glucose Regulation

Cellular organelle and protein function

- Mitochondria

- Collagen

- Transporters

- Detoxification enzymes

Cell-matrix interactions

- The Human Reference Protein Interactome

 - Protein-Protein interactions

Cellular Senescence

- Introduction to the Cell Biology of Aging

Chromosome and Telomere regulation
Autophagy and Mitophagy
Key Proteins and Pathways that Regulate Lifespan
IIS Pathway
TOR Pathway
Dietary Restriction Induced Longevity

Section II

Philosophy and Principles of Precision Medicine in Clinical Practice

History and Definitions of Precision Medicine
Biostatistics
Disease Taxonomy
Precision, Personalized, or Individualized Medicine Philosophy
The Precision Medicine Encounter
Molecular and Surveillance Diagnostics
Laboratory Biomarkers
Diagnostic biomarkers
Monitoring biomarkers
Response biomarkers
Predictive versus Prognostic biomarkers
Reasonably Likely Surrogate Endpoint
Safety biomarkers
Susceptibility/Risk biomarkers
Validated Surrogate Endpoint
Whole Genome Sequencing
Prevention and Precision Medicine
Patient-Centric Education
Ethical Considerations
Legal and Regulatory Implications
Access to care
Precision medicine and the Revenue Cycle

Section III

The Multi-Omics of Precision Medicine

Genomics
Cancer Risk and Genomics
Polygenic Risk Scores
Pharmacogenetics, Pharmacogenomics, and Pharmacoproteomics
Nutrigenomics
Gene-diet Interaction Studies
Phenotypes
Risk Variants
Approach to the patient
Epigenetics

Cancer Implications

Aging

Transcriptomics

Proteomics

The Human Protein Atlas

RNA Profiles

Inflammation

Oxidation

Ischemia

Immune Dysregulation

Metabolomics and Glycomics

Pharmacometabolomics

Microbiomics

Microbiome

Mycobiome

Dysbiosis

Exposomics (Environmental Medicine)

The Human Chronobiome

Section IV

Systems Biology and Therapeutic Considerations

Cardiovascular

Gastroenterology and Hepatobiliary

Endocrinology

Neurology and Psychiatry

Allergy and Immunology

Hematology and Oncology

Pulmonary

Ophthalmology

Musculoskeletal, Orthopedics, and Rheumatology

Infectious Disease

Dermatology

Nephrology and Urology

Reproductive Health

Section V

Network Analysis

Network Medicine and Cellular Biology

Network Medicine and Public Health

Integrating -Omics, Imaging, and Clinical Data
Research Frameworks and Research Study Design
Bioinformatics
Artificial Intelligence, Machine Learning, and Data Science in Precision
Medicine
Leveraging Data from Wearable Technology

Section VI

The Current and Future State of Precision Medicine

Organizations and Resources for the Physician
Federal Programs
Data sharing
Global Implications
Economics of Precision Medicine
Future Implications

Section VII

Therapeutics and New Technology

Medical Devices
CRISPR/Cas-9 and gene editing
Gene and cell therapies
Rare diseases
Oncology
Autoimmune diseases

Please note, our curriculum is subject to changes over time.

Have a suggestion or feedback? Email us at info@theabopm.org

We would love to hear from you!