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

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!