Novel Drugs: Immuno, Gene and Cell Therapies Course Agenda

Novel Drugs: Immuno, Gene and Cell Therapies course focuses on the most innovative drugs currently in development or newly on the market. The inspiration for these emerging medicines is our own immune system, so we begin with a look at immunology. The rest of the day is spent learning about the science, development challenges and healthcare potential of immunotherapies, gene therapies and cell therapies.

Five Takeaways

1. The rationale behind cancer immunotherapies
2. The challenges and second-generation opportunities for immunotherapies
3. Differentiation between the types of DNA- and RNA-based therapies
4. Improved understanding of gene therapy and genome editing
5. Ability to discuss multiple applications of genome editing

Course Agenda

Immunology: How the Body Fights Disease 9:00-10:15
Immune system cells and tissues
Non-specific response: inflammation
Cytokines
  Autoimmune and inflammatory disease
  Inflammation and obesity
Specific response: T-cells and B-cells
Cytotoxic T-cell structure and function
Helper T-cell structure and function
Regulatory T-cell structure and function
Immune system activation

Break 10:15-10:30

Immunotherapies Part 1 10:30-12:00
Tumor microenvironment
How tumor cells evade the immune system
Checkpoint inhibitor therapies
Next generation checkpoint inhibitors
Chimeric antigen receptor therapies (CAR-T)
CAR-T variations
CAR-T therapy for blood cancers
Preparation and expansion of CD19-CAR-T lymphocytes
CAR-T for solid tumors

Lunch 12:00-1:00

Immunotherapies Part 2 1:30-3:00
CAR-T challenges
Process-specific
Safety
CAR-T 2.0: controlling activation
Bispecific CAR-T
On/off switches
Oxygen-sensitive CAR-T
Ultrasound activation
Off the shelf CAR-T
CAR-T in autoimmunity, HIV
CAR-NK, CAR-MA, TCR Therapies

DNA- and RNA-Based Therapeutics 1:45-3:00
DNA role in disease
RNA therapeutics: Antisense, siRNA, microRNA, mRNA
Gene transfer
Ex vivo vs. in vivo gene delivery
Gene therapy
Viral vectors used in gene therapy
Genome editing: zinc finger nuclease
Gene transfer vs. genome editing
Genome editing: curing HIV?
Genome editing: CRISPR/CAS9

**Break** 3:00-3:15

**CRISPR Applications** 3:15-4:15
CRISPR in the clinic
CRISPR in agbiotech
RNA editing
CRISPR-based diagnostics
Base-editors
CRISPR as an antibiotic

**Q&A|Evaluation** 4:15-4:30