

## Course Agenda

### 2018 BioBasics™: Biotech for the Non-Scientist Agenda

BioBasics is an intensive two-day course starting with a review of the healthcare sectors and the scientific concepts required for understanding the biopharma industry. Building on this knowledge, the course delves into the cause of genetic and infectious disease, how disease is diagnosed, and the various therapeutic strategies used to mitigate disease. The latest innovations in immunotherapies, RNA technology, gene therapy, checkpoint inhibitors, CAR-T and more are explained.

#### Day One

##### **Industry Overview 9:00-9:30**

Healthcare industry sectors  
Small molecule drugs  
Large molecule drugs (biologics)  
Peptide drugs  
Generics and biosimilars

##### **Biology: Basis of Biopharma 9:30-10:15**

Biotechnology defined  
Molecules critical to life  
Cell structure and function  
Focus on cellular cell signaling  
Industry application: antagonists and agonists as drugs

##### **Break 10:15-10:30**

##### **DNA: Biotech's Blueprint 10:30-11:15**

DNA structure, chromosomes and genes  
DNA function  
*Lab: DNA isolation and extraction*

##### **Protein's: Biopharma's Workhorse 11:15-12:00**

How DNA codes for proteins  
Protein structure  
Post-translational modifications  
Post-translational modifications critical to making biologics  
Chaperone therapeutics  
Industry application: using the proteome for drug discovery

##### **Lunch 12:00-1:00**

### **Genetic Basis of Disease 1:00-2:30**

Mutations: source of genetic variation

Epigenetics and epigenetic medicines

Genetic basis of disease

Monogenic and polygenic diseases

Industry application: identifying mutations that cause disease

Precision medicine: breast cancer

Companion diagnostics

*Activity: Genetic variation taste test*

### **Break 2:30-2:45**

### **Genomics: Understanding the Genetic Basis of Disease 2:45-4:15**

Genomics defined

Identifying mutations that cause disease

- PCR

- Microarrays

- Next generation sequencing

- Third generation sequencing

Industry application: using big data to treat rare disease

Liquid biopsies

### **Q&A/Review 4:15-4:30**

## **Day Two**

### **Treating Genetic Disease 9:00-10:15**

Antisense therapy

Exon skipping therapy

Gene therapy

Zinc finger nuclease therapy

CRISPR/Cas9 therapy

mRNA therapy

### **Break 10:15-10:30**

### **Immunology and Infectious Disease 10:30-12:00**

Cells and tissues of the immune system

Non-specific immune response: inflammation

Industry application: understanding autoimmune and inflammatory disease

Specific immune response: T-cells and B-cells

Antibody structure and function

Cytotoxic T-cell structure and function

Helper T-cells and cytokines functions

**Lunch 12:00-1:00**

**Activating an Immune Response: Vaccines 1:00-1:30**

Immunological memory

How vaccines work

Types of vaccines: DNA and oncolytic vaccines

Industry application: making an HIV vaccine

**Immunotherapies 1:30-2:45**

Polyclonal vs. monoclonal antibodies

Therapeutic monoclonal antibody for:

- Oncology

- Autoimmune disorders

- Infectious disease

Industry application: treating cholesterol with PCSK9

Bispecific antibody function

Antibody-drug conjugate function

Immune system checkpoint therapies

- PD1 & PDL-1 in the clinic

CAR-T

Other CAR therapies

**Break 2:45-3:00**

**Producing Cures: Biomanufacturing 3:00-4:15**

Production platforms: bacterial cells and mammalian cells

Cell line development

Cell bank production and qualification

Bulk upstream process: scale-up

Bulk downstream process: harvest and purification

Purification: types of chromatography

Formulation, fill and finish

Activity: *Column chromatography*

**Q&A/Review 4:15-4:30**