BioImmersion™: Biotech for the Non-Scientist

BioImmersion™: Biotech for the Non-Scientist is a three-day, in-depth course that delves into the scientific details on a broad number of biotechnology topics. BioImmersion is divided into three distinct sections: the fundamental biology upon which the healthcare industry is built; the science driving the innovative therapeutics that are saving lives; and the business of biopharma including drug discovery, development and manufacturing. Become fluent in the science and business of biopharma by taking this comprehensive course.

Five takeaways:

1. Fluency in the terminology and acronyms of the biopharma industry
2. Comprehensive scientific background needed to understand your company's, competitor's or client's products
3. Improved ability to communicate with scientists, regulators, colleagues and clients
4. Understanding of how a molecule moves from the lab to the marketplace
5. Innovative new developments within the biopharma industry

Course Agenda

Day One

Industry Overview *9:00-10:15*
Biotechnology defined
Industry sectors
Categories and characteristics of drugs
Generics and biosimilars
Research support companies
Intersection of academia and industry

Break *10:15-10:30*

Biology: Basis of Biopharma *10:30-11:30*
Process of biotechnology
Cell structure and function
Molecules critical to life
Cellular communication: cell signaling
Industry application: antagonists and agonists

DNA: Biopharma's Blueprint *11:30-12:30*
History of DNA discovery
DNA structure and function
DNA replication
DNA amplification: PCR
Chromosomes and genes
Lab: DNA isolation and extraction

Lunch *12:30-1:30*

Proteins: Biopharma's Workhorse *1:30-2:45*
How DNA codes for proteins
Protein structure
Post-translational modifications (PTM)
Industry application: PTM and making biologics
Protein folding
Chaperone therapeutics
Industry application: proteome and drug discovery

Break *2:45-3:00*

Genetic Basis of Disease *3:00-4:15*
Alleles
Dominant and recessive diseases
Activity: Genetic Taste Test
Mutations: source of genetic variation
Genetic basis of disease
Genome-wide association studies
Personalized medicine
Companion diagnostics
Pharmacogenomics

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

Day Two

Genomics: Understanding the Genetic Basis of Disease *9:00-10:30*
Genomics defined
Non-coding DNA: the regulome
DNA microarrays (gene chips)
Applications of DNA microarrays
Next generation sequencing
Applications of next generation sequencing
From big data to rare disease
Third generation sequencing
Personalized medicine: integrating the 'omics
Comparative genomics
Lab: Microarray to Determine Drug Metabolism

Break *10:30-10:45*

Treating Genetic Disease *10:45-12:00*
RNA therapies: antisense, siRNA, microRNA, mRNA
Changing gene expression: exon-skipping therapy, gene therapy
Viral vectors
Genome editing: zinc finger nuclease, CRISPR/CAS9
Industry application: curing HIV

Lunch *12:00-1:00*

Immunology & Infectious Disease *1:00-2:15*
Immune system cells and tissues
Phases of the immune response
Non-specific immune response: inflammation
Industry application: understanding autoimmune disease
Specific immune response: T-cells and B-cells
Antibodies: structure and function
Cytotoxic T-cell structure and function
Helper T-cell structure and function

Vaccines: Activating an Immune Response *2:15-2:45*
Immunological memory
How vaccines work
Types of vaccines: whole pathogen, subunit, DNA
Making the annual flu vaccines
Industry application: oncolytic vaccines
Industry application: HIV vaccine

Break *2:45-3:00*

Immunotherapies: Biopharma's Therapeutic Powerhouse *3:00-4:15*
Polyclonal and monoclonal antibodies
Making therapeutic antibodies: hybridomas, phage display, genetically engineered mice
Humanized vs. fully human antibodies
Therapeutic monoclonal antibodies: oncology, autoimmune disorders, infectious disease
Industry application: treating cholesterol with PCSK9 inhibitors
Bispecific antibodies
Antibody-drug conjugates
Immune system checkpoint inhibitor therapies
Chimeric antigen receptor therapies (CAR-T)
Controlling CAR-T
TCR therapies

Day Three

Making Biologics *9:00-10:15*
Biologics vs. small molecule drugs
Recombinant DNA
Plasmids
Production platforms: bacteria and mammalian
Production platforms: animals and plants
Fusion protein therapeutics
Biosimilars: definition and approval pathway
Patents and data exclusivity

Break *10:15-10:30*

Biomanufacturing *10:30-11:30*
Cell line development
Cell bank production and qualification
Bulk upstream process: scale-up
Bulk downstream process: harvest
Purification: column chromatography
Formulation, fill and finish
Lab: column chromatography

Stem Cells and Regenerative Medicine
11:30-12:30
Stem cells properties
Promises and challenges
Induced pluripotent stem cells
Stem cells in the clinic
Organ and tissue replacement

Lunch *12:30-1:30*

Drug Discovery *1:30-2:30*
Rational drug discovery
Target identification and validation
Therapeutic options
Assay development
High throughput screening (HTS)
In vitro safety and efficacy testing
Biomarkers

Break *2:30-2:45*

Drug Development *2:45-3:45*
Regulatory agencies
Preclinical studies
Clinical trials
Pharmacovigilance
Drug development timeline
Desirable FDA designations
Orphan drugs

Newly Approved and In Development *3:45-4:15*
Microbiome and related therapies
Circulating tumor cells: detection and capture
Curing hepatitis C
Liquid biopsies
Exosome-based therapeutics
Epigenetic medicine and diagnostics
Overcoming antibiotic resistance: bacteriophage

Wrap Up and Evaluation *4:15-4:30*