

BioBasics 101: The Biology of Biotech for the Non-Scientist

Level One

BioBasics 101: The Biology of Biotech for the Non-Scientist is an intensive two-day course on the foundational science that forms the backbone of biopharma. We explore the connection between the basic biology and industry applications including personalized medicine, comparative genomics, and companion diagnostics. This course was designed for the non-scientist who wants to better understand how basic biology informs the development of biopharma products.

Five takeaways

1. Fluency in the essential terminology of the biopharma industry
2. Understanding of the science driving your company or client's products
3. Improved ability to communicate with colleagues and stakeholders
4. Determination of where your organization "fits" in the healthcare landscape
5. Explanation of innovative therapies within the biopharma industry

Agenda

Day One

Introductions 9:00-9:15

Industry Overview 9:15-10:15

Healthcare industry sectors
Industry hubs and associations
FDA and industry
NIH and industry
Academia and industry
Research support companies
Funding

Break 10:15-10:25

Biology: Basis of Biopharma 10:25-11:25

Process of biotechnology
Molecules critical to life
Cell structure
Industry application: receptors and drug targets
Industry application: mitochondria disease
Cell functions: signaling, protein production
Focus on cell signaling
Industry application: cell signaling and cancer

Break 11:25-11:35

DNA: Biopharma's Blueprint 11:35-12:00

History of DNA discovery
DNA structure
DNA organization: chromosomes and genes

Lunch 12:00-12:45

DNA: Biopharma's Blueprint *continued*
12:45-1:45

Industry application: chromosome abnormalities
DNA function: coding for proteins
Industry application: pharmacogenomics
DNA replication
Industry application: PCR

Break 1:45-2:00

Proteins: Biopharma's Workhorse 2:00-3:15

How DNA codes for proteins
Chaperone therapeutics
Industry application: pharmacological chaperone

Proteins: Biopharma's Workhorse

continued 2:00-3:15

Post-translational modifications (PTM)
Industry application: PTM and biologics
Industry application: drug discovery
Gene expression
Epigenetics
Industry application: epigenetic medicines

Wrap-Up 3:15-3:30

Day Two

Genetic Engineering 9:00-10:00

Plasmids
Restriction enzymes
Recombinant DNA/plasmid
Recombinant proteins
Making recombinant proteins
Pharm animals and plants
Recombinant proteins in healthcare

Break 10:00-10:10

Genetic Basis of Disease 10:10-11:25

Alleles
Phenotype and genotype
Dominant and recessive genes
Industry application: disease and genes
Mutations: source of genetic variation
Causes of mutations
Genetic basis of disease
Industry application: genome-wide studies
Monogenic and polygenic diseases
Industry application: sickle cell anemia
Industry application: cancer
Precision medicine
Companion diagnostics
Industry application: HER2+ and Herceptin

Break 11:25-11:35

Genomics: Understanding the Genetic Basis of Disease 11:35-12:15

Genomics defined
Non-coding DNA: the regulome
Identifying mutations that cause disease
Common genetic diseases
Rare genetic diseases

Lunch 12:15-1:00

Genomics: Understanding the Genetic Basis of Disease *continued* 1:00-2:15

Industry application: identifying mutations
DNA microarrays (gene chips)
Microarrays uses
Lab: Microarray to Determine Drug Metabolism
Third generation gene sequencing
Industry application: big data and rare disease
Personalized medicine: integrating the 'omics
Industry application: comparative genomics

Break 2:15-2:30

Drugs Mitigate Disease: An Overview 2:30-3:15

Categories and characteristics of drugs
Small molecule drugs
 Antibiotics
 Peptide drugs
Large molecule drugs (biologics)
 Vaccines
 Therapeutic antibodies
 Immunotherapies
 Gene therapies
 Cell therapies
 Stem therapies

Wrap-Up 3:15-3:30