



SIGNATURE COURSE | LEVEL ONE

SUGGESTED PREREQUISITE: NONE

## ■ BioBasics 101

### The Biology of Biotech for the Non-Scientist

#### OVERVIEW

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**BioBasics 101: The Biology of Biotech for the Non-Scientist** is an intensive course that explains the foundational science upon which all biopharma therapies are based. Day one focuses on the function of DNA, RNA, proteins, and cell signaling and how each interacts in both healthy and diseased tissue. Day two builds on your new-found molecular biology knowledge. This includes a more in-depth look at genetic disease and how genetic engineering is used to create personalized medicine options for patients. The course ends with a survey of small molecule drugs, biologics, and vaccines and explains how each mitigates disease at the molecular level. BioBasics 101 will increase your scientific knowledge so that you can converse more effectively with colleagues, clients, regulators, and scientists.

BioBasics 101 was developed for the non-science professional who works within or services the biopharma industry.

#### Five Takeaways:

1. Fluency in the essential terminology of the biopharma industry.
2. Improved ability to communicate more effectively with colleagues, clients, scientists, and regulators.
3. Increased scientific understanding of your company or client products.
4. Determination of how your employer or client organization “fits” in the healthcare landscape.
5. Integration of your business and science operations to empower staff to recognize new opportunities.

## AGENDA

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### DAY ONE

#### **Industry Overview:** 75 minutes

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

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#### **Break** 10 minutes

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#### **Biology: Basis of Biopharma** 60 minutes

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

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#### **Break** 10 minutes

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#### **DNA: Biopharma's Blueprint** 25 minutes

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

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#### **Lunch** 45 minutes

#### **DNA: Biopharma's Blueprint** *continued*

60 minutes

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

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#### **Break** 15 minutes

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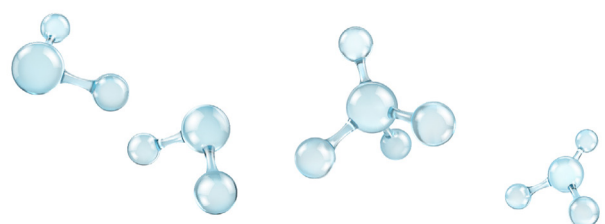
#### **Proteins: Biopharma's Workhorse**

75 minutes

How DNA codes for proteins  
Chaperone therapeutics  
Industry application: pharmacological chaperone  
Post-translational modifications (PTM)  
Industry application: PTM and biologics  
Industry application: drug discovery  
Gene expression  
Epigenetics  
Industry application: epigenetic medicines

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#### **Wrap-Up** 15 minutes



## DAY TWO

### Genetic Engineering 60 minutes

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

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### Break 10 minutes

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### Genetic Basis of Disease 75 minutes

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

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### Break 10 minutes

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### Genomics: Understanding the Genetic Basis of Disease 40 minutes

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

### Lunch 45 minutes

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### Genomics: Understanding the Genetic Basis of Disease *continued* 75 minutes

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

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### Break 15 minutes

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### Drugs Mitigate Disease: An Overview 45 minutes

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

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### Wrap-Up 15 minutes

