# BioBasics™: Biotech for the Non-Scientist

**BioBasics™: Biotech for the Non-Scientist** is an intensive two-day course that starts with a review of the scientific concepts required for understanding the biopharma industry. Building on this knowledge, the course quickly ramps up to include a survey of the hottest applications in biotech today, including precision medicine, genomics and genome-based therapies, immunotherapies, and biomanufacturing. If you are a non-scientist who wants to better understand the science driving the industry, this course is for you.

## Five takeaways:

1. Scientific background needed to better understand your company or client's products
2. Fluency in the essential terminology of the industry
3. An understanding of where your company "fits" in the biopharma landscape
4. An improved ability to communicate with colleagues and stakeholders
5. An overview of the most innovative new developments within the biopharma industry

## Course Agenda

### 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

**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*

**Proteins: Biopharma's Workhorse** *11:15-12:00*
How DNA codes for proteins
Protein structure
Post-translational modifications
Chaperone therapeutics
Industry application: proteome and drug discovery

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

biotech Primer

**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
Precision medicine: breast cancer
Companion diagnostics
*Lab: 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 and microarrays
  Next and third generation sequencing
Industry application: big data and rare disease

**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 overview
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: autoimmune 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*

**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 inhibitors
Bispecific antibody function
Antibody-drug conjugate function
Immune system checkpoint inhibitor therapies
CAR-T
Detecting cancer: liquid biopsies

**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
*Lab: Column chromatography*

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