



## BioPharma

### Broad Definition

Biopharma is a subset of the pharmaceutical industry that involves production, manufacturing, or extraction of therapies through biological organisms. Such organisms could be human cells, pigs, fungi, or microbes. Biopharma drugs result through biotech research methods.

Examples of biopharmaceutical drugs include vaccines, antibody treatments, gene therapies, cell implants, modern insulin, and recombinant protein drugs.

### Behaviors

- Many large pharmaceutical companies have biopharma products; many large companies that are known as “biotech” companies are actually biopharma companies
- Range of startups, mid-sized companies, and large companies; startups look to be acquired directly by large biopharma, like traditional pharma
- Contract research organizations becoming the norm for research, especially in mid-sized biopharma: outside companies do the lab work, IP under the companies
- Due to the intersection of biotech and pharma, biopharma is leading the transition to more powerful and secure technology stacks and is therefore hiring a lot of software/IT people as well as scientists
- Typically follow pharma in structure -- rigid, hierarchical structures; well-divided groups, slow progress in discovery/approval, highly-regulated

### Types of Roles Available

- Combination of roles in biotech and pharmaceutical industries, including QA, Regulatory Affairs, Production, IT, operations, business development, etc.
- Diving further into R&D Divisions in companies that develop drugs (typically separated into different, but interacting, groups of scientists)
  - *Drug Discovery*: responsible for synthesizing and finding the initial therapies that will be used in the body; groups are split by either type of therapy (i.e. antibody) or by disease (i.e. oncology, neurology)
  - *Drug Development*: typically any science position that is not labeled “drug

- discovery”: tests therapy in cells and model organisms, like mice
- *Clinical*: Monitors clinical data during trials, works with doctors to explain science/make clinical decisions
- *Product Development*: figures out how to deliver drug, combines reagents to deliver correct dosages
- Types of R&D Positions open to recent graduates
  - *Bioinformatics/Software*: Most pharma will hire computer scientists with only a bachelors that have some research background, usually in genetics
  - *Associate Scientist*: lowest-level position where scientific experiments are planned/done independently, some require PhD but most are bachelors with 1-2 years of lab experience
  - *Lab Tech*: responsible for repetitive tasks, like cleaning, cutting tissue samples, mixing reagents, making agar plates -- often requires certification, bachelor’s-level job

**Valued Skills**

- Moreso depends on size of company rather than blanket skills -- flexibility for startups and small companies, organization
  - Scientific communication skills needed
  - Data analysis, statistics looked upon as very favorable in this industry ●
- Experience with automation (frequently in hospital-associated labs that do drug discovery) is also appreciated

**Relevant Companies\***

Gilead	Novavax
Amgen	QPex Biopharma
Genentech	Janssen (J&J)
CRISPR Therapeutics	AbbVie
Alnylam Pharmaceuticals	Moderna

\*Some of these companies are full biopharma companies; others sell some biopharma products

**To Follow/Join:**

- *Flagship Pioneering*: the parent venture firm/company behind Moderna, incubates and launches therapeutic/biopharma startups; leader in the field of bio-innovation. Follow CEO on LinkedIn or get company newsletter

- *Bio Eats World Podcast, a16z Bio*: Follow for biopharma and therapeutics news, the podcast interviews prominent people in the field and each one focuses on a separate area of industry research
- *Fierce Biotech*: good biopharma news in general, once in a while read

**Relevant Majors:** Chem, ChemE, MB&B, MCDB, BME, CS, S&DS

- For research positions, a good understanding of synthetic chemistry/biochemistry or bioinformatics/computational genetics is often desired