Shreya Narayanan

Biocon Internship

12th - 25th June, 2025

The Project

To understand an overview of the role of microbial genetic engineering technologies in modern drug development and manufacturing

Overview:

1. Lab Work & Processes
2. Independent Research
3. Visit to the large-scale fermenters

Lab Process

Under the guidance of Scientist Sampritha, I was introduced to the actual practical processes that are involved in genetically engineering a microorganism, and the testing and experimentation that precede this. Specifically, the project she was working on was removing a gene that was causing a specific impurity to be produced. As a part of this, I engaged in many processes:

- agarose gel electrophoresis (for DNA analysis)
- Centrifugation (for separating cellular components)
- Conjugating (the transfer of genetic material, in this case through the pilli)
- Plating the bacterial cultures (to confirm transfer has occurred)

Outside of this specific problem, I was also able to practice microscopy (specifically slides of budding yeast), understand transformation, view actual growth of isolated colonies, and undertake plasmid visualisation with the help of blue light.

All these activities gave me in-depth insight into how theoretical biology translates into real-world experimentation.

Independent Research

Outside the lab, I explored key scientific concepts and their relevance to drug development. This includes:

- Basic principles like certain metabolic pathways (specifically glycolysis and TCA),
- The study of specific therapeutic molecules (like semaglutide)
- Certain companies that manufacture biologics (such as Novo Nordisk).

In terms of the actual work being done there, I delved into processes like Polymerase Chain Reactions (PCR), DNA transformation (which involves ligating sticky ends and inserting the recombinant DNA into the selected organisms), and identifying and verifying gene expression in the final stage.

Visits

I had the opportunity to visit the large-scale fermenters on campus, guided by Dr. Ishwar Bajaj. These facilities represent the stage after successful strain engineering, where the focus shifts to scale-up and production for commercialisation. This visit helped me understand the transition from research to manufacturing and the economic factors influencing the drug development pipeline. This section of my internship revolved more around commercial and economic viability rather than the actual experimenting occurring in the smaller-scale SCBL (strain, cell banking, biotransformation lab)

Key Takeaways

Strengthened Technical Fluency

I gained a more in-depth understanding of certain research techniques and lab processes, especially those specific to the drug development pipeline

Understanding Lab Discipline & Workflow

I had exposure to what it means to work in a lab and be a part of such an environment. I experienced firsthand the collaboration and communication required in a functioning biotechnology lab.

Boosted Observational & Analytical Skills

Through the practices of microscopy and running of gels, I honed my practical observational skills. While active note-taking and studying the lab honed my analytical ability in terms of understanding experimental outcomes and interpreting scientific processes

Deeper Academic Curiosity

The problem-solving associated with the experimentation that goes into producing these drugs deeply resonated with my analytical mindset. Through interactions with the scientists, as well as other interns, I gained insight into the passion and resilience needed to succeed in this field- and the potential it offers to be a deeply rewarding career.