IPI Academy

MANAGEMENT forum




*Presented by*
**Management Forum**

# Protein Engineering for Pharmaceutical Biotechnology

**2-3 February 27**
+ 21-22 September 27

Advance your expertise in protein engineering with this comprehensive course. Learn cutting-edge techniques in therapeutic development, biotechnology applications, and regulatory compliance, ideal for professionals in pharmaceutical and industrial sectors.

**Format:**
Live online

**CPD:**
12 hours for your records

Certificate of completion

# Course overview

**Enhance your knowledge in protein engineering to understand how to advance therapeutic development and industrial applications.**

Protein-based therapeutics have significantly advanced and created new paradigms in disease treatment. Half of the top ten selling drugs in 2023 are protein-based therapeutics.

Protein engineering, a field perfected by nature over billions of years, can now be replicated and customised in the laboratory within weeks. This course aims to equip professionals with the skills to develop more valuable and better-featured proteins, particularly enzymes, for a wide range of pharmaceutical applications. By understanding and applying the latest advancements in molecular biology, protein chemistry, enzymology, and structural chemistry, attendees will be able to create practical solutions that meet the needs of the pharmaceutical sector. The significance and timelessness of this training are underscored by the 2018 Nobel Prize for Chemistry, awarded for groundbreaking work in protein engineering, highlighting its growing importance and potential to revolutionise various industries.

## Benefits of attending

- **Deepen** your understanding of protein engineering concepts, enhancing your expertise in molecular biology, protein chemistry and enzymology
- **Stay updated** with the latest advancements in protein engineering, including CRISPR-Cas9 gene editing, phage display for protein-protein interactions, and mRNA therapeutics, keeping you at the forefront of the field
- **Explore** the development and application of protein-based therapeutics such as bispecific antibodies, antibody fragments, mRNA vaccines, antibody-drug conjugates, and antibody-directed enzyme pro-drug therapy
- **Discover** how protein engineering is used in biotechnology, including the development of genetically modified organisms (GMOs), biopharmaceuticals, directed evolution for enzyme production, and industrial enzymes

## Who should attend?

This course is designed for professionals with a foundational understanding of biochemistry and molecular biology, seeking to deepen their knowledge and understanding in protein engineering, including:

- Biotechnology professionals
- Regulatory affairs professionals
- Pharmaceutical development specialists
- Quality assurance and control officers
- Clinical researchers
- Process development engineers
- Project managers

# Programme

## Day 1

**Introduction to protein engineering**

- **Definition and Overview:** What is Protein engineering?
- **Proteins and their structure-function relationship**
- **Historical Background:** Milestones in Protein engineering and biotechnology in pharmaceuticals

**Techniques and tools in genetic engineering**

- **CRISPR-Cas9**
  - Mechanisms and applications in gene editing
- **Recombinant DNA Technology**
  - How genes are spliced and introduced into host organisms
  - Mutagenesis techniques, site-directed, random mutagenesis
- **Gene cloning**
  - Cloning vectors, host organisms, and production of recombinant proteins
- **Gene expression systems**
  - Bacterial, yeast, and mammalian cell expression systems for protein production
- **RNA interference (RNAi)**
  - Mechanisms and therapeutic use for gene silencing in diseases

**Pharmaceutical applications of protein engineering**

- **Biopharmaceuticals**
  - Production of therapeutic proteins (e.g., insulin, human growth hormone)
  - Monoclonal antibodies (mAbs) for cancer, autoimmune diseases, etc.
- **Gene therapy**
  - Correcting genetic disorders by inserting or modifying genes (e.g., treatments for hemophilia, cystic fibrosis)
  - CRISPR-based gene editing for inherited diseases
- **Vaccines**
  - Development of recombinant vaccines (e.g., hepatitis B vaccine)
  - mRNA vaccines (e.g., COVID-19 vaccines)

**Production of biopharmaceuticals**

- **Bioreactors and fermentation**
  - Use of genetically engineered microorganisms to produce drugs in large quantities
- **Downstream processing**
  - Purification and scaling up of genetically engineered drugs
- **Quality control**
  - Ensuring purity, potency, and safety of biopharmaceutical products

## Day 2

**Ethical and regulatory considerations**

- **Ethics of genetic and protein engineering**
  - Ethical concerns surrounding genetic modifications in humans, animals, and microorganisms
- **Regulatory frameworks**
  - FDA, EMA, and other global regulatory bodies for approving genetically engineered drugs
- **Intellectual property**
  - Parenting genetically engineered products and processes

**Advances in protein engineering for pharmaceuticals**

- **CRISPR-based therapies**
  - Engineering proteins for diagnostics
  - Clinical trials and potential cures for genetic diseases
- **Synthetic biology**
  - Designing new biological systems for drug production and personalised medicine
- **Personalised medicine**
  - Tailoring treatments based on individual genetic profiles
- **Biologics vs. small molecule drugs**
  - Differences and advantages of biologics developed through genetic engineering

**Challenges in protein engineering for pharmaceuticals**

- **Safety Concerns**
  - Off-target effects in gene editing and immune responses to engineered proteins
- **Cost and accessibility**
  - High production costs and making therapies accessible to a wider population
- **Scalability**
  - Challenges in producing genetically engineered drugs on a large scale

**Case studies and examples**

- **Insulin production**
  - How genetically engineered bacteria produce human insulin
- **Gene therapy success stories**
  - Examples of successful gene therapies (e.g., Luxturna for inherited retinal disease)
- **Monoclonal antibodies**
  - Their role in treating cancers and autoimmune diseases

**Engineering modern drugs and targeted cancer therapy**

- Checkpoint inhibitors
- CAR-T cancer therapy
- Antibody-drug conjugates (ADC)
- Antibody Directed ProDrug Therapy (ADEP)

**Engineering of superantigens for targeted cancer therapy**

# Presenter



**Sayed Goda**

Sayed K Goda, a biochemistry and drug discovery professor, has a robust academic background. He earned a BSc in Chemistry and an MSc in organic chemistry from Cairo University, Egypt. He then pursued a PhD in Biochemistry from the University of Southampton, UK. Recognising the pivotal role of technology management in his field, he obtained an MBA in technology management from the Open University, UK, in 2000. His diverse educational background equips him with a unique perspective and a broad range of skills, making him a valuable asset in the field of biochemistry and drug discovery.

After completing his PhD, Sayed embarked on a leadership journey at the Porton Down establishment in Salisbury, UK, where he served for fourteen years as a senior scientist and a team leader. During that time, he led commercial and medically sensitive research. He employed protein engineering to produce novel commercially and medically important proteins.

In 2002, Sayed's academic prowess and leadership skills led him to a professor position at Cairo University, Egypt. His tenure was marked by transformative contributions, notably the establishment of a new BSc Biotechnology program. He also supervised many successful MSc and PhD degrees.

In 2006, Dr. Goda accepted a professor position at Qatar University, Qatar, where he taught many major courses in biochemistry and biotechnology and successfully obtained many research grants.

In 2012, Sayed's expertise and reputation led him to a senior scientist and Professor position at the Antidoping laboratory in Qatar. He led research in various fields and established a protein engineering laboratory here. His exceptional ability to secure research funds, totalling over two million, for cancer-targeting drug discovery projects. His collaboration with Groningen University, Netherlands, resulted in the successful completion of four Ph. Ds and numerous publications, further solidifying his status as a prolific researcher.

Sayed has years of commercial and medical research experience in a conventional research institute in the UK.

He is also a regular reviewer for many high-impact journals, and he is currently a guest editor for Cancers.

# Course dates

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|---|---|---|
| **2-3 February 27** | **Live online**<br>09:30-17:00 **UK (London)** (UTC+00)<br>*Course code 16970* | GBP **1,299** ~~1,499~~<br>EUR **1,819** ~~2,099~~<br>USD **2,087** ~~2,399~~<br>**Until 08 Dec** |
| **21-22 September 27** | **Live online**<br>09:30-17:00 **UK (London)** (UTC+01)<br>*Course code 17287* | GBP **1,299** ~~1,499~~<br>EUR **1,819** ~~2,099~~<br>USD **2,087** ~~2,399~~<br>**Until 27 Jul** |

## How to book

**Online:**
ipi.academy/2793

Alternatively contact us to book, or if you have any queries:

**Email:**
info@ipiacademy.com

**Phone:**
+44 (0)20 7749 4749

## Discounts

- Booking more than one delegate on any one date qualifies for a **30% discount** on the second and subsequent places.
- Most events qualify for an **early booking discount** prior to 6 weeks before the course date. Be sure to check on our website, where the latest discounts will be shown.

## Further information

**Fee**
The fee includes all meals and refreshments for the duration of the course (for venue-based courses) and a complete set of course materials (provided electronically). If you have any particular requirements, please advise customer services when booking.

**Please note**
IPI Academy (and our training partners) reserve the right to change the content and timing of the programme, the speakers, the date and venue due to reasons beyond their control. In the unlikely event that the course is cancelled, we will refund the registration fee and disclaim any further liability.

**Terms and conditions**
The rest of the our terms, the event cancellation policy and the terms and conditions are on our website, please visit ipi.academy/content/terms-and-conditions

## Run this programme in-house for your whole team

Coming to IPI Academy for your in-house training provides an all-inclusive service which gives you access to a wide variety of content, learning platforms and delivery mechanisms as well as your own personal training adviser who will work with you from the initial enquiry through to feedback and follow-up after the programme.

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IPI Academy

IPI Academy is a training initiative of Falconbury and Management Forum; leading providers of industry training for over 30 years, based in the UK.

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