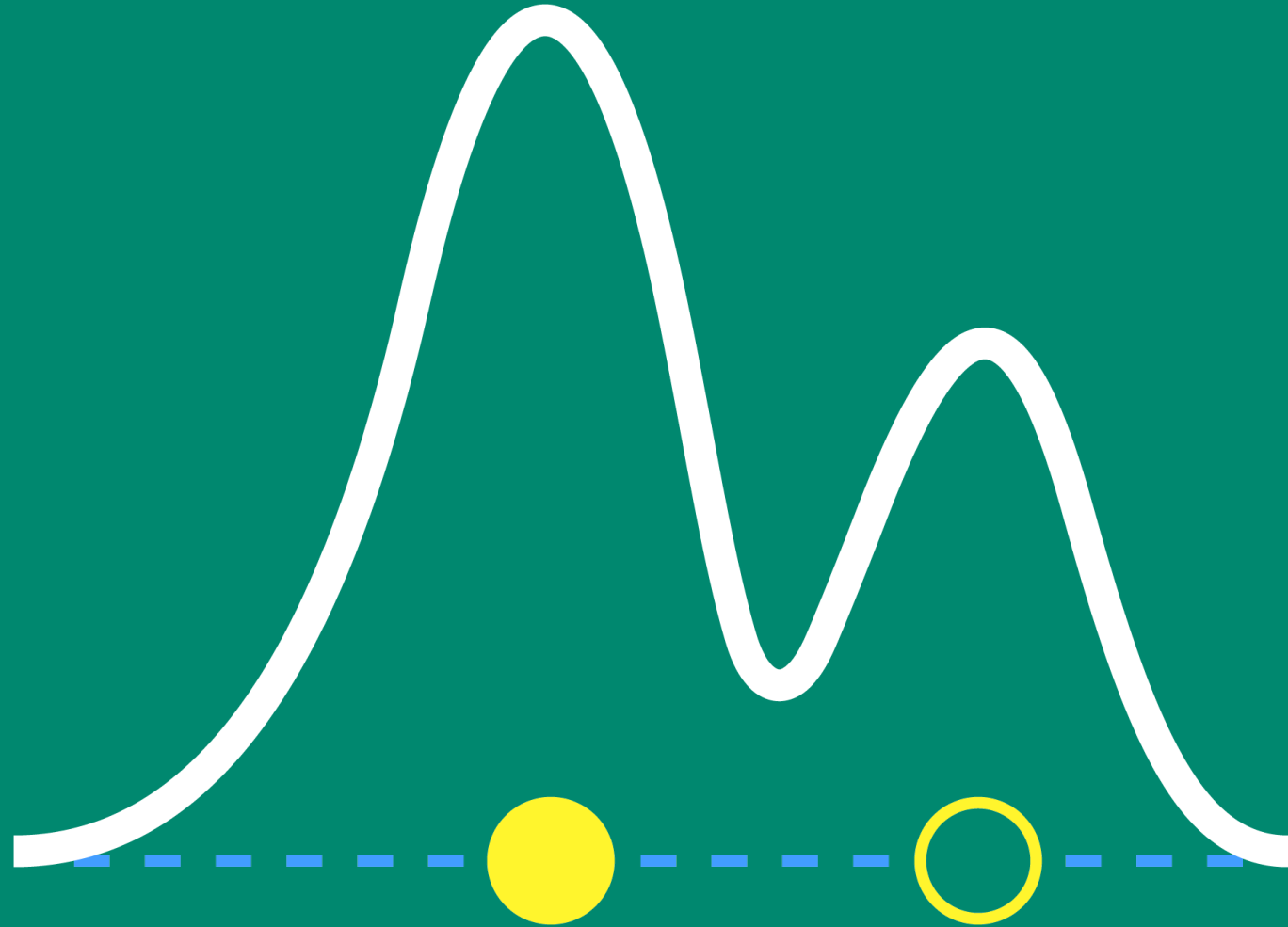
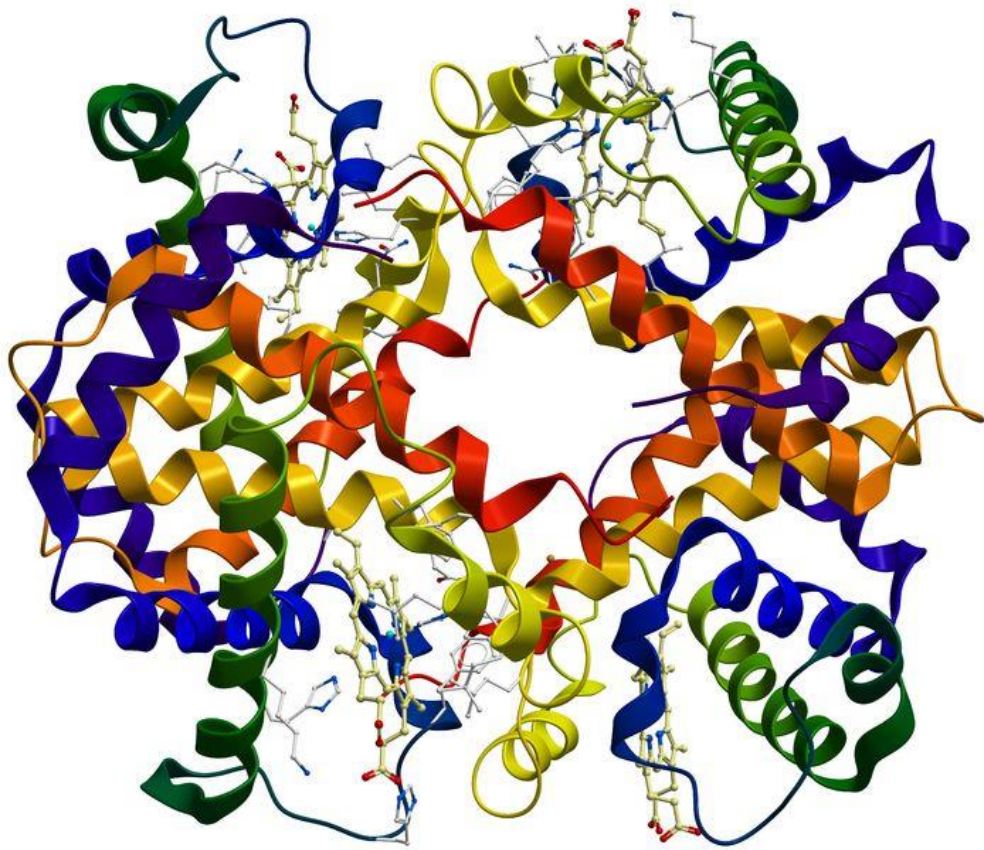


Introduction to protein purification

Part 1: proteins



What is a protein?

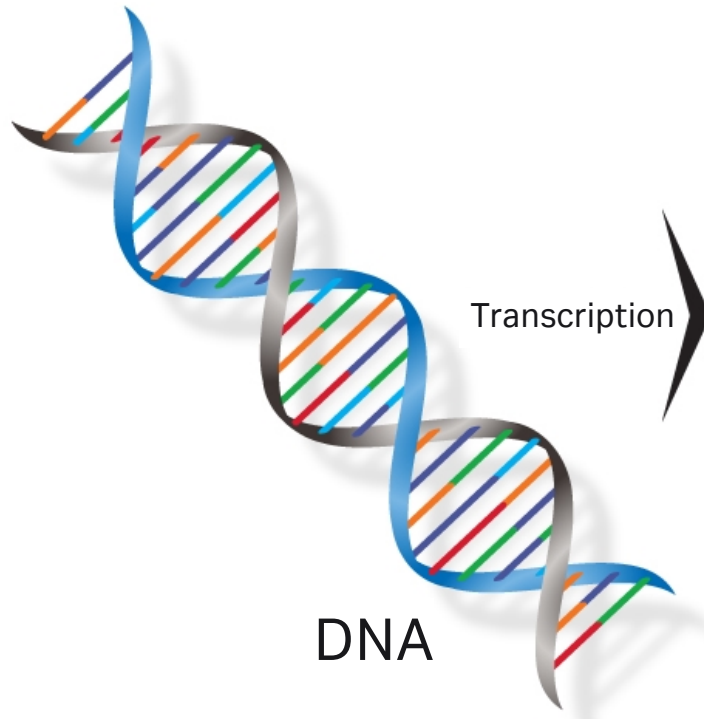


Proteins are made up of long chains of amino acids. These chains are folded into delicate structures.

A functional protein consists of these chains arranged into large, very complex, structures.

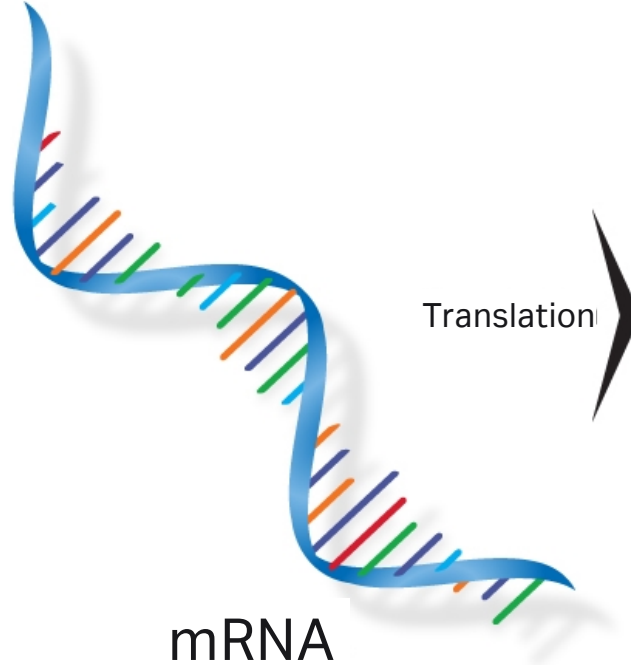
How are proteins made?

The genes (DNA) are the blueprint for proteins.



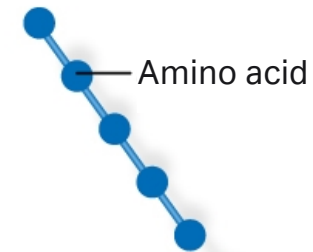
Transcription

The DNA is transcribed into RNA.



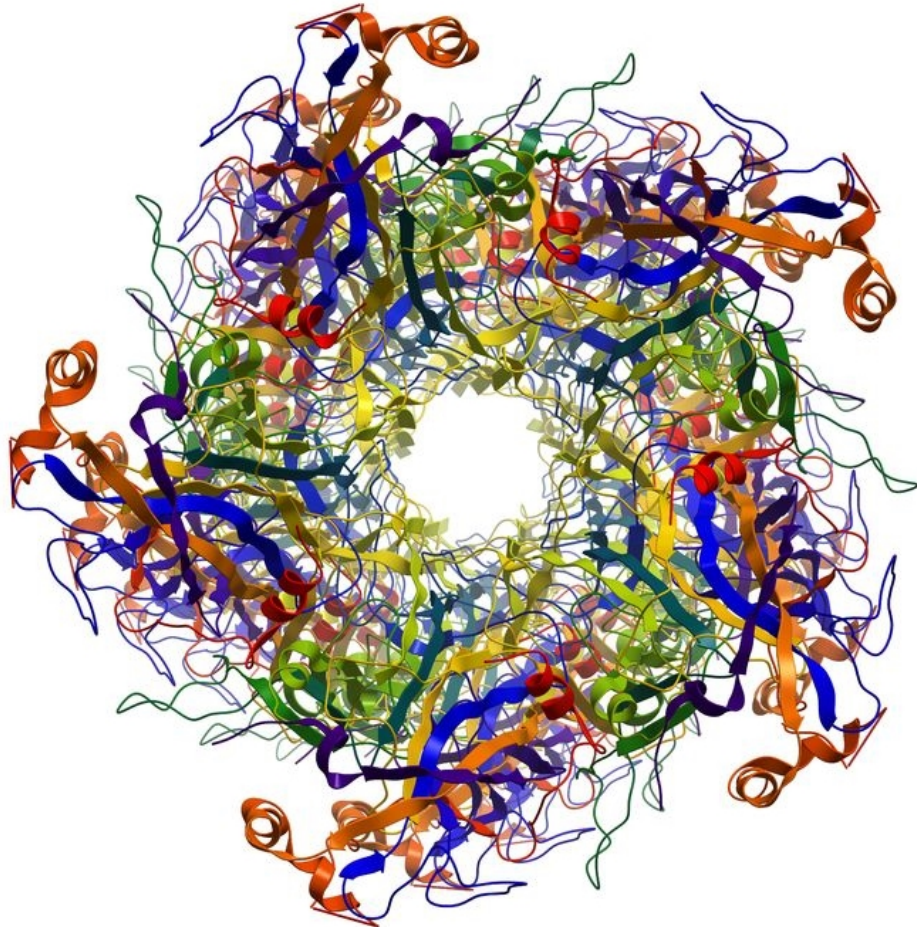
Translation

RNA is translated into proteins.



Protein

What are proteins good for?



Catalysts (enzymes): digestion (proteases)

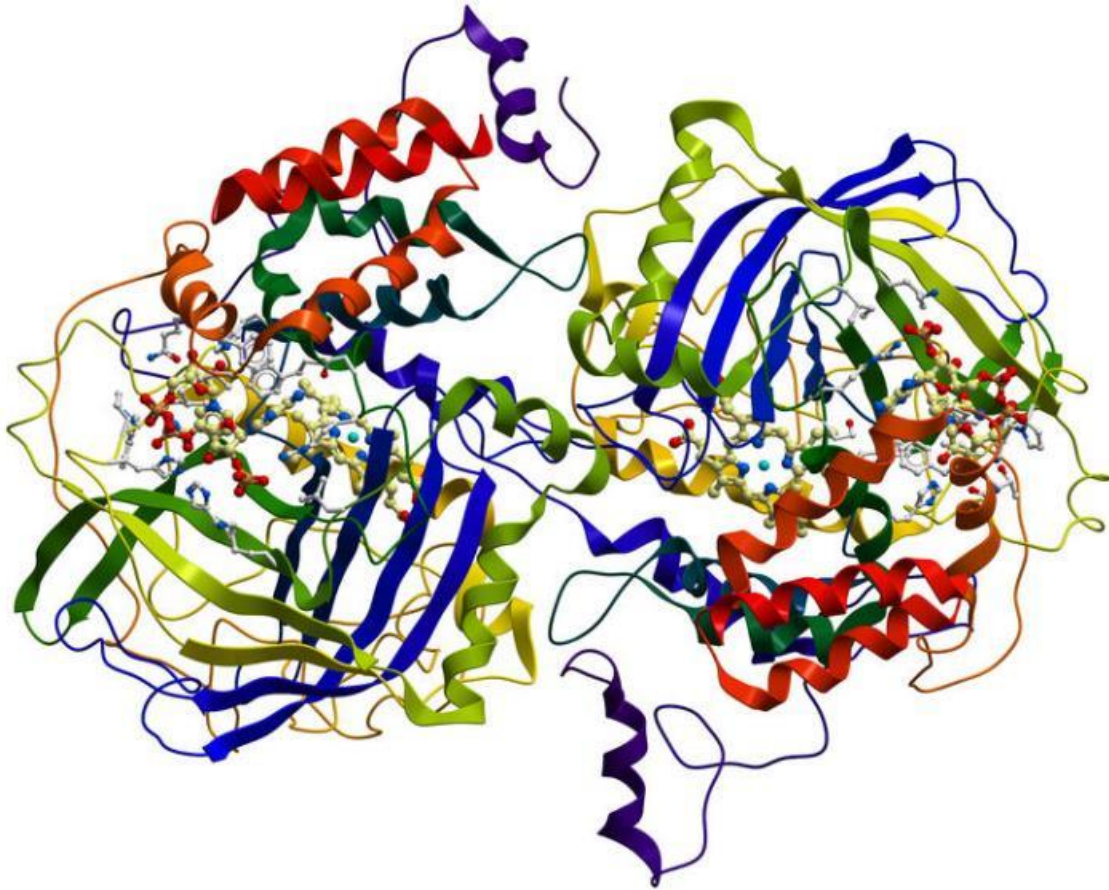
Transporters: breathing (hemoglobin)

Receptors: energy/sugar balance (insulin),
allergy (IgE)

Structure builders: skeleton (collagen),
muscles (actin/myosin)

Defense: immune system (antibodies)

Why purify proteins?



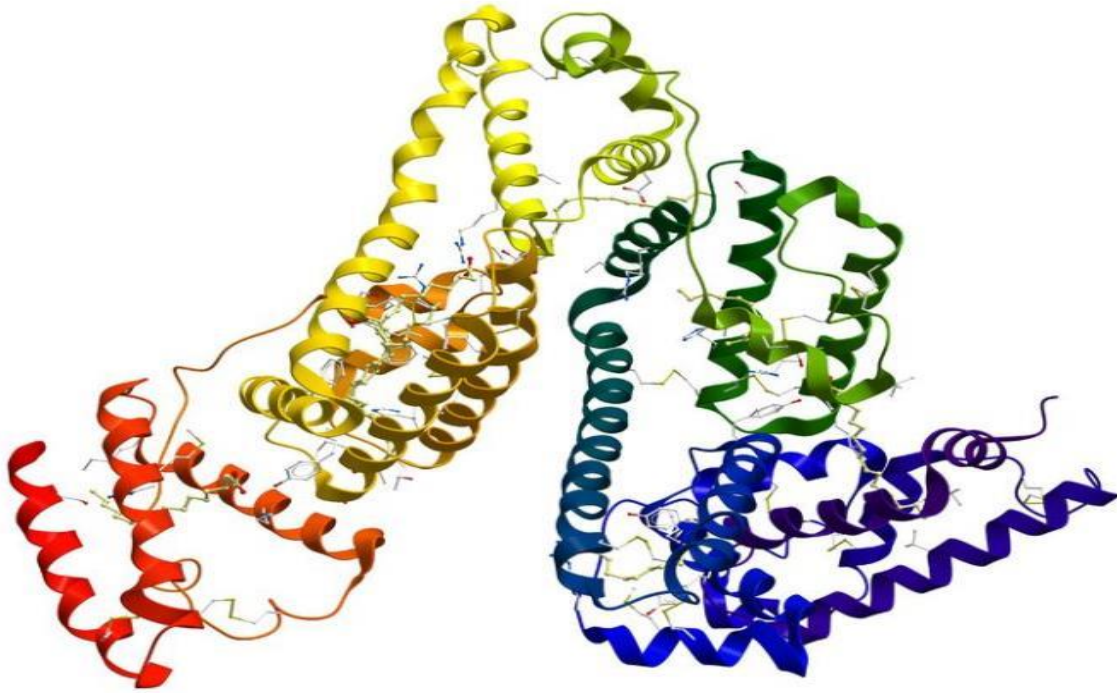
They are fundamental in controlling biological functions.

They are key factors in many diseases.

Therefore they are of high interest to the pharmaceutical industry.

For videos showing principles of common protein purification techniques, visit our [protein purification education site](#)

How many proteins are there?



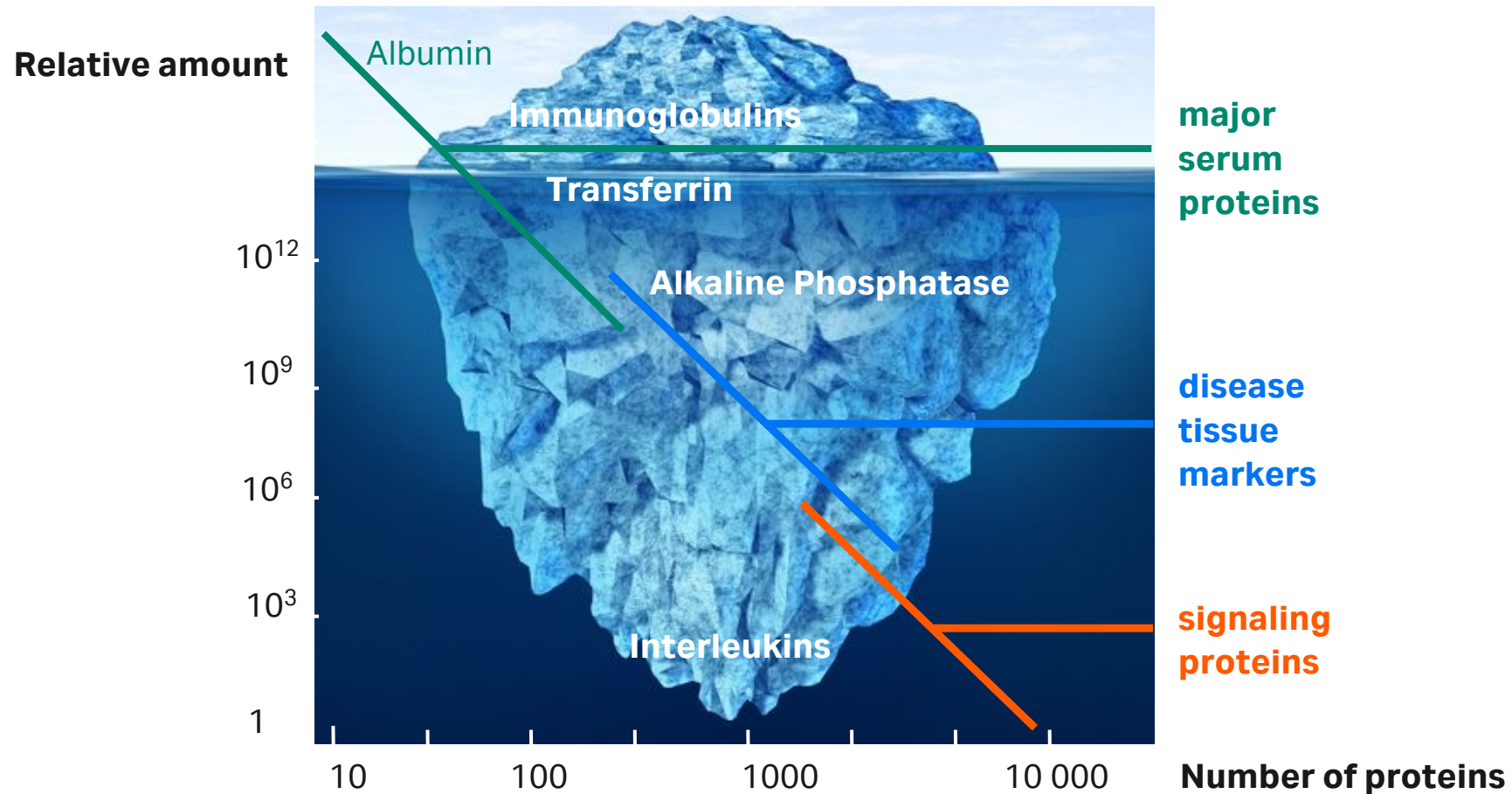
The exact number of proteins in the human body is not known.

There are more than 20 000 protein-encoding genes.

Some genes can give rise to several proteins.

Proteins are present in a wide dynamic range, both in amount and in time.

The human proteome: dynamic range



Biopharmaceutical drugs

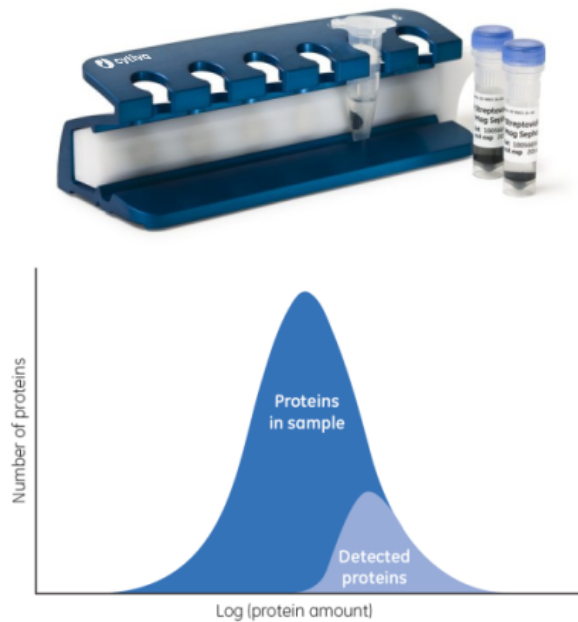
In 2013, there were over 300 approved biopharmaceutical drugs on the market. A quarter of these drugs were related to monoclonal antibodies (MAbs).



Reasons for purification

Proteomics sample preparation

Aim: find proteins associated with disease



Research-scale purification

Aim: Purify target for functional/structural studies

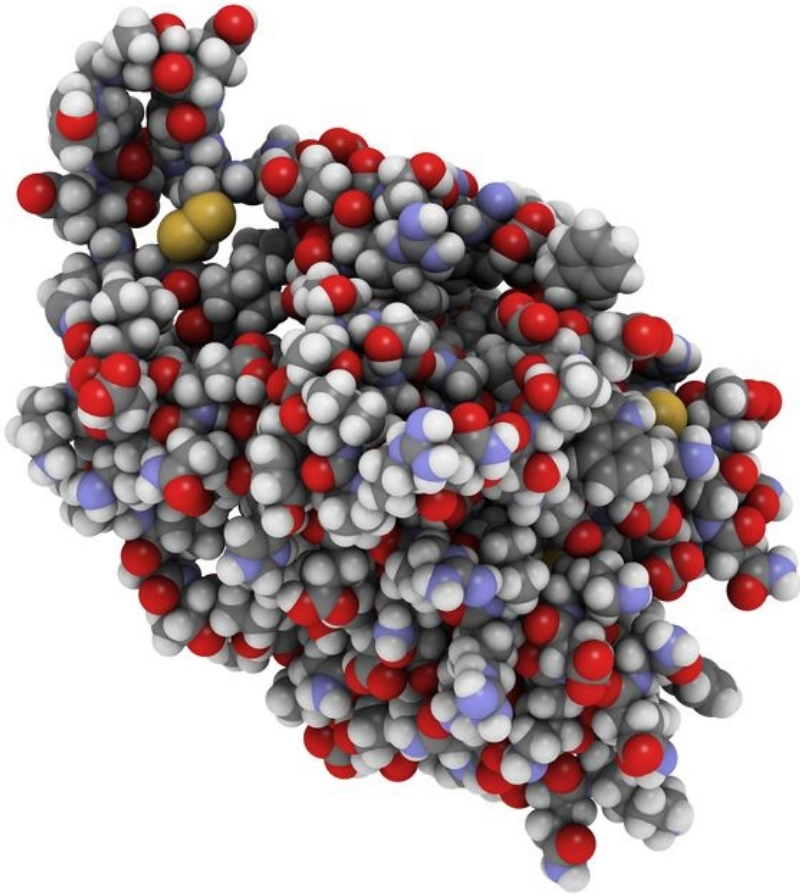


Industrial-scale purification

Aim: Large-scale production of biopharmaceuticals



Summary proteins



Proteins are made of long chains of amino acids folded into complex structures.

Proteins are the working molecules of the cell and fill many different functions in the human body.

Proteins and parts of proteins can be used as medicines.

Efficient purification of proteins is required both in research and production of biopharmaceuticals.



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