CBMNet

Crossing Biological Membranes Network

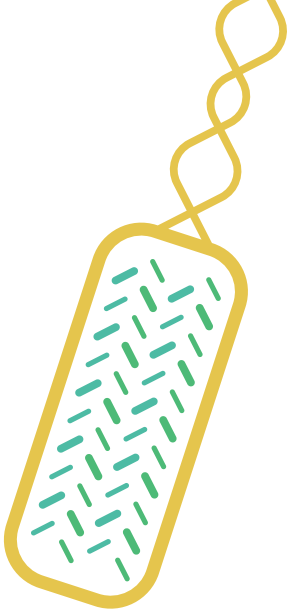
WHAT CAN INDUSTRIAL BIOTECHNOLOGY DO FOR US?

CBMNet is a UK-wide research network, which receives public funding via the UK's Biotechnology and Biological Sciences Research Council.

CBM stands for 'Crossing Biological Membranes', which you can think about as 'getting substances in and out of cells'

Our network exists to help scientists in universities to work together with scientists in the industrial world who are using things like plants, yeast and bacteria to produce new types of fuels and useful chemicals

We refer to this type of industry as 'Industrial Biotechnology'



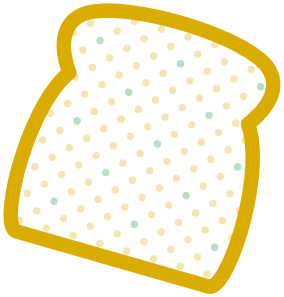
E.coli bacteria

WHAT IS INDUSTRIAL BIOTECHNOLOGY?

Industrial Biotechnology might sound like a very new and high-tech sector, but in one form or another it has been around for a long time, for example:

MAKING BREAD

Leavened bread making is believed to date back to ancient Egyptian times.



MAKING PENICILLIN

Famously discovered by Alexander Fleming in 1928. Fermentation process scaled up for large scale production in 1940s.

All of these things are produced by fermentation, with the help of yeast and bacteria

Industrial biotechnology is the use of plants, fungi & bacteria to produce chemicals, energy & food

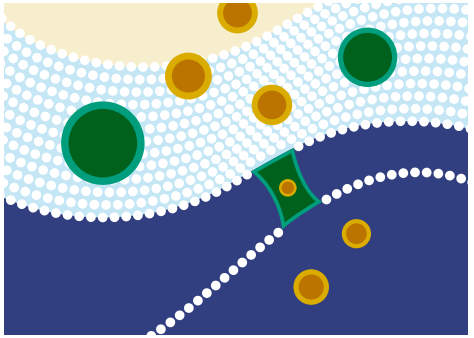
BENEFITS

- Oil has been over $100/barrel for most of the past few years, and despite the recent drop in price, it's still a finite resource with a volatile price tag and extraction is damaging to the environment
- The use of Industrial Biotechnology can lead to more sustainable processes, in some cases producing less carbon dioxide (CO_2), a gas responsible for global warming, or using renewable sources of starting materials (for example, plants)
- Industrial Biotechnology can also produce chemicals that are difficult to make in a chemistry lab, such as biological drug therapies and enzymes in biological washing powder
- By using bacteria and yeast in Industrial Biotechnology processes, we can make all sorts of useful new things, such as cleaner fuels, greener plastics, and even the deodorants of the future

HOW IT WORKS

How are we using bacteria and yeast cells in Industrial Biotechnology processes?

A substance is fed to the cells and they take this in and convert it into a product. For example, to make yoghurt, lactose is taken up by the bacteria *Lactobacillus* and it produces lactic acid (yoghurt).



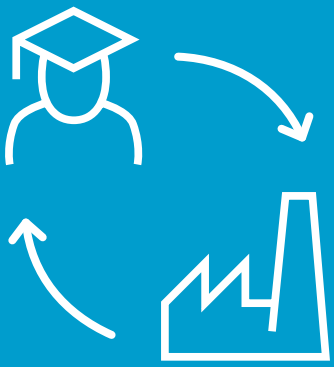
Cell membrane showing a substance crossing it via a transporter

How are the substances taken up into and pushed back out of the cells?

- In order to get substances in and out, cell membranes contain tunnel-like structures called transporters
- There are 100s of different types of transporters and each different type of transporter will only work for substances of a specific size and shape
- It is this 'crossing of biological membranes', via transporters, that our network researches in order to improve Industrial Biotechnology processes

BRINGING ACADEMICS & INDUSTRY TOGETHER

- Industrial Biotechnology is an important industry, harnessing the power of living cells to produce biofuels, plastics and other useful chemicals
- An understanding of how cells get substances in and out is vital to many Industrial Biotechnology processes
- CBMNet is helping academic and industrial scientists across the UK to work together and carry out cutting edge research on cell membrane transporters



GET IN TOUCH

For information about CBMNet please contact us at:

CBMNet, The University of Sheffield
E100 Addison, Firth Court
Western Bank
Sheffield, S10 2TN

cbm@sheffield.ac.uk
www.cbmnetnibb.net

@CBMNet_NIBB

Find us on linkedin

The University Of Sheffield.

BBSRC bioscience for the future

THE UNIVERSITY of York