

Social habits of cells may hold key to fighting diseases

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Scientists in Manchester are working to change the social habits of living cells – an innovation that could bring about cleaner and greener fuel and help fight diseases such as cancer and diabetes.

As part of a new £18 million project spanning six countries, The Manchester Centre for Integrative Systems Biology at The University of Manchester will spearhead important new research into an emerging field of science and engineering known as *Systems Biology*.

Scientists have recently discovered that networking in living cells may determine whether a cell causes diabetes or cancer or helps to maintain our health.

By adjusting and modifying the way cells network, researchers believe it's possible to adjust the behaviour of living cells and reduce the chances of disease occurring.

Using this approach Manchester researchers working on the Systems Biology of Microorganisms (SysMO) research programme will also drive a project that looks at how the yeast used in the production of beer and bread can be turned into an efficient producer of bioethanol.

Other work to be carried out in Manchester includes the investigation of 'lactobacilli'. Some of these occasionally turn into flesh-eating bacteria or cause human diseases such as strep throat and rashes, whereas others are completely safe and are used in the production of cheeses and

yoghurts.

It's hoped the work will lead not only to greater understanding of how 'wrong' networks lead to disease, but also to the production of drugs and other foods more efficiently and safely.

Academics will also look at 'pseudomonads' – soil bacteria that may make people ill but can also be used to degrade nasty compounds in the environment, or to create compounds now being made by chemical industries.

Researchers will also focus on 'thermophilic' organisms that live naturally in hot springs, and examine how their networks enable them to survive high and varying temperatures. It's hoped that this research will reveal how to make any living organism cope better with extreme conditions. It may also lead to better performance of detergents and cosmetics.

All research will be carried out in the Manchester Interdisciplinary Biocentre (MIB) – a unique, purpose-built, £38m facility that brings together experts from a wide range of disciplines in order to tackle major challenges in quantitative, interdisciplinary bioscience.

Professor Douglas Kell, Director of the MCISB, said: "Manchester is a leading centre for Systems Biology research and it is very exciting that so many of the SysMO projects have a Manchester component. Our involvement in these projects will allow us to achieve much added value and to develop and show best practice across all of them."

Professor Hans Westerhoff, AstraZeneca Professor of Systems Biology and Director of the Doctoral Training Centre on Systems Biology at The University of Manchester, said: "This is a unique opportunity to begin to understand how networking contributes to the functioning of living cells

inside and outside our bodies.

“It enables us to integrate the best groups from six European countries and will address four concrete issues of energy, the disease-benefit balance, white biotechnology and robustness.”

Systems Biology combines molecular biology and mathematics, which have traditionally been seen as the equivalents of fire and water. This type of research is still viewed as controversial by some in the scientific community.

But researchers involved in SysMO believe this approach will allow them to obtain a very large set of mathematical equations that describe living cells. This may then allow those cells to be engineered in a number of ways, with numerous benefits in the field of medicine and in the commercial world.

Source: University of Manchester

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