Cell communication, the EU way

European Commission

The CELLCOMPUT researchers say communication between genetically modified cells is possible, describing them as being electronic circuits. Led by the University of Gothenburg in Sweden, the researchers have made major headway in enabling complex systems to be built in the future where the body's own cells help maintain our health. The research was recently presented in the journal *Nature*.

The researchers used yeast cells to generate synthetic circuits based on gene-regulated communication between cells. They genetically modified these cells, thus making them 'sense' their surroundings on the basis of set criteria and in turn they send signals to other yeast cells by secreting molecules.

The team said combining these different cells is like combining LEGO bricks, effectively generating more complicated circuits. Researchers could perform complex 'electronic' functions thanks to the construction of yeast cells with different genetic modifications, according to the researchers.

'Even though engineered cells can’t do the same job as a real computer, our study paves the way for building complex constructions from these cells,' explained Kentaro Furukawa from the Department of Cell and Molecular Biology at the University of Gothenburg, a co-author of the study.

'In the future we expect that it will be possible to use similar cell-to-cell communication systems in the human body to detect changes in the state of health, to help fight illness at an early stage, or to act as biosensors to detect pollutants in connection with our ability to break down toxic substances in the environment.'

In silico cells are being designed, making it possible to communicate in a predictable matter to form communication systems.

According to the scientists, synthetic biology is just starting to find a niche in the world of research. 'One application is the design of biological systems that are not found in nature,' they said. It should be noted that past studies in the development of various artificial connections within genetically modified cells, including oscillators, sensors and circuit breakers, have been fruitful.

A number of these artificial networks could be used for both medical and industrial applications such as in biosensing, bioremediation (use of microorganismal metabolism to remove pollutants), and agriculture. But the researchers said that despite the huge potential for these artificial connections, there are technical limitations to date, mostly due to the artificial systems in individual cells that fail to work as expected.

Researchers from Germany and Spain contributed to this study.

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