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Old medicines could help unlock cancer cures

An old diabetes drug could help treat pancreatic cancer – one of the most deadly forms of the disease – thanks to an unexpected discovery about the way tumour cells behave.

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A group of universities, hospitals and pharmaceutical companies made the discovery while they were working together on a study into how pancreatic tumour cells are able to resist current treatments.

The Issue

Cancer is Europe's second biggest killer after cardiovascular disease, causing 1.7 million deaths each year, according to the World Health Organization (WHO).

Lung cancer is the biggest cancer killer for men in the EU, while for women its breast cancer. For men and women, the second biggest killer is colorectal cancer, according to the EU.

Unhealthy lifestyle choices such as smoking, heavy drinking and eating junk food cause 60 % of all cancers, according to the WHO.

Pancreatic cancer is relatively rare but it's one of the most deadly cancers, with a five-year survival rate of around 5 % because it is often diagnosed late and has a high level of resistance to chemotherapy.

As they were looking at these resilient tumour cells, the consortium of research laboratories, working together under the EU-funded EPC-TM-NET project, made the unexpected discovery that stem cells in the tumour could be suffocated with a drug already used to treat diabetes.

'This compound has an important impact on the metabolic features of these cancer cells which is a particularity that we discovered during the course of the studies,' said Professor Christopher Heeschen, at the Barts Cancer Institute, Queen Mary University of London, UK, who coordinates EPC-TM-NET.

Because the drug, called metformin, is already approved by regulatory agencies, even though it is for another disease, it makes the development times much quicker.

Normally a cancer drug takes a decade to develop and costs upwards of EUR 1 billion, partly because extensive safety tests are required before it can be tried on people.

However, because metformin is already approved, Prof. Heeschen and his team are planning to go directly to human trials early next year.

'Repurposing drugs is a fast-track way to bring something to the clinic,' he said. 'We know that this anti-diabetic drug, metformin, can be very effective if given to the right patients. It's not perfect, but it works and it can be easily used in the clinics and that saves us at least eight years in drug development.'

It's part of a growing trend towards investigating existing drugs to fight different diseases, with many research teams now routinely screening compounds as part of their work.

Alcoholism

Professor Weiguang Wang at the University of Wolverhampton, UK, is working on a way to repurpose an anti-alcoholism drug, disulfiram, to treat cancer as part of the EU-funded NANODISCAN project.

The anti-cancer activity of disulfiram has been known for over three decades. The problem for translating it into cancer treatment is the very short half-life of disulfuram – less than two minutes – meaning it breaks down in the body before reaching the cancer cells.

'We need something to encapsulate the chemical to protect it from the degradation by the enzymes in the bloodstream,' said Prof. Wang. 'Thanks to the nanodelivery system, the half-life has already been extended to more than six hours in the blood.

'We got a very exciting result from liver, breast and brain cancers. The data will be published very soon.'

Because disulfiram is an already approved as a non-toxic drug, the international team, which includes members in the UK, Spain, Bulgaria and China, is working on animal studies and hopes to start clinical trials in around a year.

They're also turning their attention to traditional Chinese remedies, in the hope that their nanotech encapsulation technology can be used to make them into useful cancer drugs.

'We are looking at some traditional Chinese medicines that have not been used for cancer before,' said Prof. Wang. 'Nanotechnology can reduce the side effects and also improve the therapeutic effects.'

More info

EPC-TM-NET

NANODISCAN