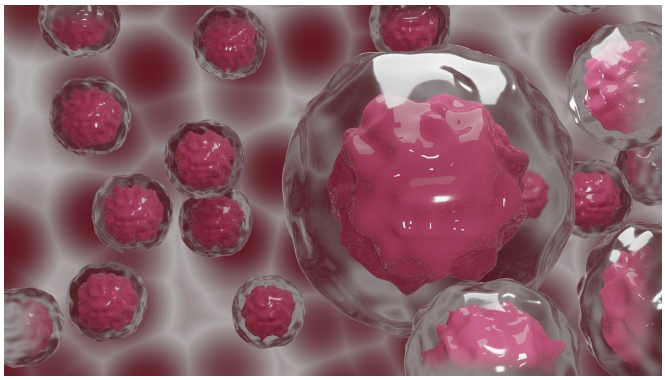
Cancer 'power failure' stops the spread of tumor cells

2 June 2021



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New research from the University of Salford shows that cutting off the fuel supply can effectively stop the spread of cancer cells.

This is important as nearly 90% of all cancer patients that undergo treatment failure, die from the spread of cancer throughout the body. Cancer spreading is known as metastasis.

Metastatic cancer cells are resistant to cancer chemotherapy and radiation treatment this creating an urgent medical need to stop the spread of cancer cells.

Scientists have identified that metastatic cancer cells require an enormous amount of energy and represent the 'fittest' cancer cells—thus explaining why they are drug-resistant.

The Translational Medicine Laboratory at the University of Salford have now isolated the 'fittest' cancer cells for the first time using a special sensor to detect ATP in living cells. ATP is the universal 'currency' of energy in all living things.

They identified that ATP-high cells were the most aggressive, making it easy to study the 'fittest' cancer cells, to discover their Achilles' heel. ATP-high cells were almost five times more metastatic.

Professor Michael P. Lisanti, MD-Ph.D., Chair of Translational Medicine, said:"This simple idea has been right under our nose, all the time; ATP is a new marker for aggressive cancer cells and treatment failure."

Professor Federica Sotgia, Ph.D., Chair of Cancer Biology and Aging, stated that:"Ultimately, ATP-depletion could prevent metastasis, by directly cutting off cancer's fuel supply."

One of the best ways to empty the fuel tank is to target the engine that produces ATP.

Fiorillo, Sotgia, Lisanti and colleagues used an FDA-approved drug that was originally designed to inhibit energy production in bacteria.

The drug, Sirturo, targeted the fuel supply of cancer cells and blocked metastasis by nearly 85%. The drug had no effects on normal cells, thereby minimizing side-effects. It found that treatment with Sirturo caused a 'power failure," but only in cancer cells.

Sirturo is already FDA-approved, with these findings paving the way for new cancer clinical trials.

This potentially life-saving research was co-authored by Dr. Marco Fiorillo, Professor Federica Sotgia and Professor Michael P. Lisanti at the University of Salford, and was published in the Nature journal, Cell Death and Differentiation.

Dr. Cristian Scatena and Professor Antonio Giuseppe Naccarato, from the University of Pisa Hospital, also collaborated in the study, using patient samples.

More information: Marco Fiorillo et al, Bedaquiline, an FDA-approved drug, inhibits mitochondrial ATP production and metastasis in vivo, by targeting the gamma subunit (ATP5F1C) of the ATP synthase, *Cell Death & Differentiation* (2021). DOI: 10.1038/s41418-021-00788-x

Provided by University of Salford