UniversitätsSpital Zürich

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A radical new way to fight cancer

Conventional cancer treatments for tumours involve reducing the oxygen flow to the diseased tissue. Now doctors at the Swiss Centre for Liver and Pancreatic Illnesses at the University Hospital of Zurich are taking a totally new approach in a trial to boost rather than prevent the oxygen flow to the tumour. The trial sees a promising new drug co-developed by a Nobel Prize winner being used for the first time on patients all over the world.

Tumours in the abdominal organs are amongst the most common and malignant types of cancer: Every year in Switzerland alone, around 6000 people develop such tumours. If the cancer is caught at an early stage, the tumour can be surgically removed and the patient can often be cured. For the majority of patients, however, this is not possible, as the tumour is already very advanced. Doctors treat such patients with a course of chemotherapy or radiation. While this may prolong the life of the patient, the associated side effects must also be taken into account. Furthermore, conventional treatments inhibit the formation of blood vessels in the tumours and thus deprive the tumour of oxygen. For a long time, experts thought that this would slow the tumour's growth. But recent studies have shown that a lack of oxygen in the tumour can cause it to become more aggressive and form metastases in other, oxygen-rich tissues.

A new approach: Boosting rather than inhibiting oxygen flow

In the Swiss Centre for Liver and Pancreatic Illnesses at the University Hospital of Zurich, oncologists, gastroenterologists, hepatologists and visceral surgeons work closely together. Professor Pierre- Alain Clavien, Director of the Clinic for Visceral and Transplant Surgery, and Dr Përparim Limani from the Centre for Liver and Pancreatic Illnesses at the University Hospital of Zurich cooperated closely with Professor Roger Stupp, Director of the Oncology Clinic, and his team on developing a new type of therapy which is now being tested in a trial initiated by the centre. This concept is the exact opposite to conventional approaches to treatments: Rather than reducing the oxygen supply in the tumour by means of conventional treatment, it promotes the absorption of oxygen in the diseased tissue. For this, the doctors use the molecule Inositol Trispyrophosphate (ITPP). The idea is to normalise the blood vessels in the tumour that have been changed by the cancer and thus to increase the effectiveness of chemotherapy or radiation and inhibit carcinogenic potential.

A drug developed by a Nobel Prize winner in chemistry, a biologist and doctors

Swissmedic, the Swiss agency tasked with the authorisation and supervision of therapeutic products, and Zurich's ethics commission approved ITPP in mid-January 2015. The trial drug was discovered by a research group of Nobel Prize winner Professor Jean-Marie Lehn (chemistry) at the University of Strasbourg and developed in close cooperation with biologist Professor Claude Nicolau

from Boston in animal experiments. Dr Përparim Limani and Professor Pierre-Alain Clavien researched the drug further in animal experiments. “The most impressive anti-tumour effects were observed when the drug was combined with standard chemotherapy”, says Professor Pierre-Alain Clavien. Even when the drug was administered without combining it with other therapies, lifespan increased and the number and size of the tumours were reduced.

First-time use on patients

Now the promising new cancer drug is being tested on 70 patients in a clinical trial. Patients with liver, pancreatic or bile duct cancer as well as patients with metastases from colon cancer will be given the trial drug before undergoing a tailored course of chemotherapy. The researchers are interested in finding out whether the patients who take the trial drug achieve better results. Attention is also being paid to further assessing the tolerability and safety of the drug. Doctors are hoping to have the initial findings of the trial at the latest in a year. Nobel Prize winner Professor Jean-Marie Lehn and Professor Claude Nicolau are also eagerly awaiting the results: “It would give us great pleasure to see that our many years of research have paid off to the benefit of cancer patients.”

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Image material:

Computer tomography of liver metastases from colon cancer (JPEG)
Caption: *This cross-section of a body has been taken from feet to head on a level with the liver. The many dark spots in the liver show that the tumour is well advanced and can no longer be surgically removed.*