Engineers given a role in making medical diagnoses

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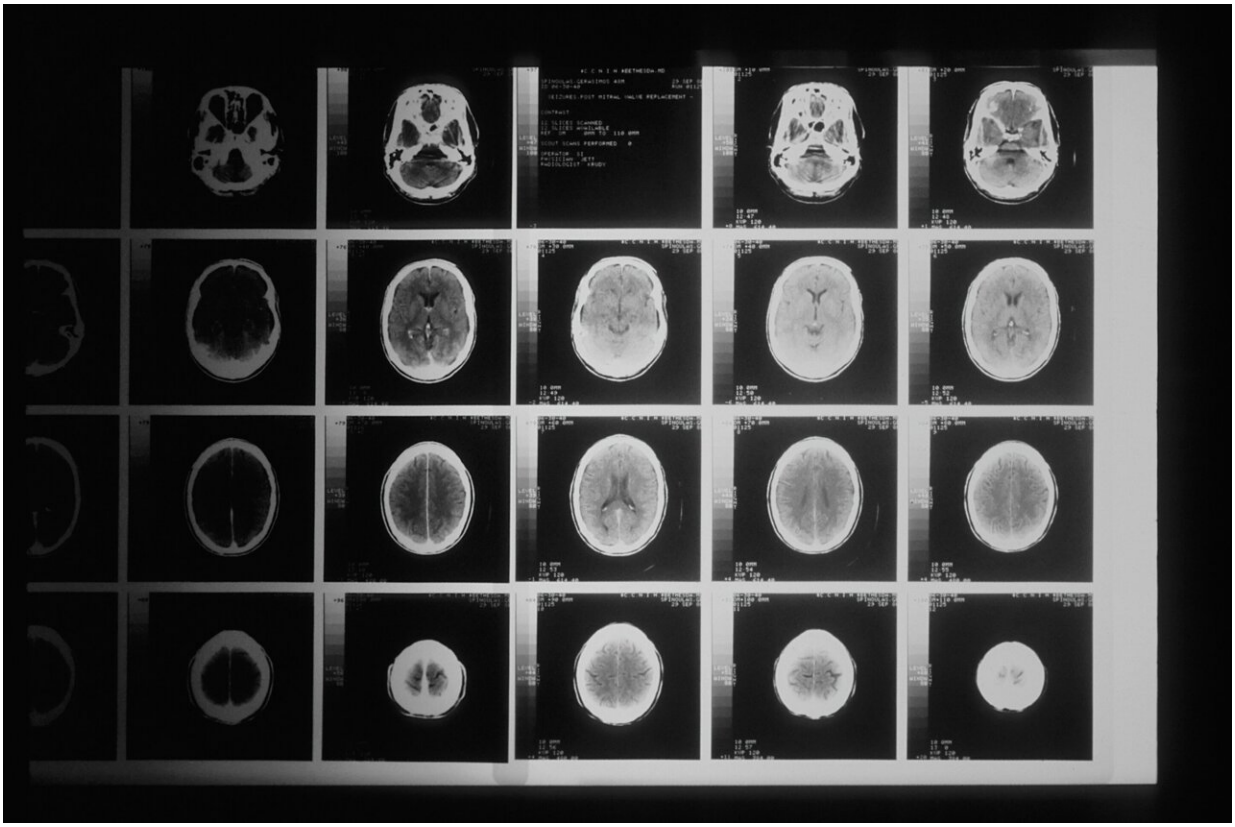

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Engineers will play a bigger role in the healthcare system over the next ten years and thus also in cancer treatment. This is the opinion of Professor Thomas L. Andresen, former head of department at DTU

Health Tech and now CEO of the biotech company T-Cypher Bio. He finds that the biggest change will be that doctors will no longer be the only ones who can diagnose and treat patients.

"We will see greater automation based on computer systems. Today, artificial intelligence is being trained with data from the very best doctors to be at least as good at, for example, spotting cancer when the patient has an MRI scan or a CT scan. The reason for this is that computers are better than humans at recognizing patterns in large data volumes," says Thomas L. Andresen.

He assesses that the development will mean that more people will survive their cancer disease.

"Today, we have a treatment guarantee, which means that it must take maximum four weeks from the time you receive a referral from your doctor and until you initiate treatment under the cancer package. In ten years, we should have reduced the waiting time to three days. This is the time it will take for the computer to find a potential cancerous nodule and until the doctor decides which treatment to commence. In addition, better diagnostic methods are also being developed, which means that the cancer can be detected earlier."

How do you see future cancer treatment?

"I see an interesting development away from the treatments that we know today. There will obviously still be a need to operate on and remove specific cancerous nodules such as in skin cancer. But when broad treatment is to be provided, it makes no sense to give chemotherapy or something else that is toxic to our entire system. It damages the immune system, and the cancer often returns.

The new treatment form is gene and cell therapy. I see immunotherapy

as the only future in cancer treatment. If we can code the immune system to recognize specific cancer types, we will have developed a continuous treatment form. The development we're currently witnessing is a huge leap forward in relation to what I've previously seen.

What kind of development is it?

"We've seen a breakthrough in antibodies such as PD-1 inhibitors, which help the body fight cancer itself. It is an effective treatment with few side effects that works really well in 20 percent of patients with certain cancerous nodules. It was an eye opener that made people believe in immunotherapy. Another form of immunotherapy is so-called T-cell therapy, where the patient's own white blood cells are taken from the patient's tumor and genetically modified in the laboratory. Here, the blood cells are modified to make them particularly aggressive against cancer cells. They are subsequently injected back into the patient, where they recognize and attack the cancer cells. This has produced good results in, for example, blood cancer."

What are the biggest challenges in immunotherapy?

"There are many challenges. Right now, the focus is on what we can do with immune cells and genetic modifications. It's about developing superimmune cells against a specific form of cancer. Right down at cellular level. Programming people's own immune system to recognize cancer cells is a highly complicated challenge. I've myself tried to train the T cells of the immune system to be more effective in finding and removing cancer cells. Such a process technology solution with living cells involves both biologists and engineers."

Is there something that has surprised you in cancer research?

"Ten years ago, I would never have thought that we would begin taking cells out of patients, genetically modifying them, and injecting them back into the patient's body. It seemed insanely expensive. A few years ago, the first cell therapy was approved as standard treatment in the United States. It's now being implemented in Europe. It's still expensive, but the development is now progressing at a fast pace."

Provided by Technical University of Denmark