

TF1

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Laurence Ferrari [anchor]

So, in the fight against cancer, a new therapy is now being developed. A treatment relying on nuclear medicine will target cancer cells — and only those. A TF1 team gained exclusive access to the French plant where the material is being made and visited the scientists in charge of the first clinical trials in the United States. Our investigative team includes Guillaume Debré, Michel Finn, Jean-François Noyet and Laure Bignanet.

Guillaume Debré, TF1 [off camera]

The La Hague plant stands among the hedges of Cotentin like a fortress. One of the most closely monitored civilian nuclear sites in France. It's here that AREVA recycles most of the nuclear fuel and stores in Olympic-size pools the largest quantity of uranium in Europe. Enough to fuel more than fifty nuclear plants.

Thierry Guillaume, fuel receiving area – AREVA

Nine thousand tons of uranium fuel are stored in our pools. This represents six or seven years of electricity production in France.

Guillaume Debré [off camera]

A gigantic inventory which is not only used to produce electricity. This could lead to a revolution in the fight against cancer. No television crew has filmed in this lab before. Here, AREVA engineers have been working for more than three years on one of the most advanced nuclear medicine projects. Extracting what is called lead two-twelve. An extremely rare and powerful radionuclide whose radiation is limited to a fraction of a millimeter.

Patrick Maquaire, an AREVA chemistry specialist

We use chemical processes to extract and separate the lead. This lead is the radioactive isotope lead-212, which we send to American labs to develop the therapy.

Guillaume Debré [off camera]

These therapies are called radio immunotherapy. It uses radioactivity to destroy cancerous cells, which are shown in black in this animation. Lead 212 is combined with an antibody, which detects the cancerous cells. Lead 212 destroys the targeted cells without damaging the healthy tissue. This degree of precision is the ultimate weapon to fight aggressive forms of cancer against which chemotherapy is essentially useless today.

Patrick Bourdet, AREVA Med CEO

What we do is destroy individual cells. Only the cancerous cell will be impacted. This is a targeted therapy. There is no side effect, which is absolutely extraordinary.

Guillaume Debré [off camera]

Every month, minuscule doses of this extremely precious lead two-twelve cross the Atlantic in tightly sealed containers. Destination: the National Cancer Institute in the United States. As it could not find a French partner able to transform these particles into medical treatment quickly enough, AREVA decided to team with a U.S. partner.

Here, the radioactive particles are injected into sick mice suffering from various forms of cancer that would be difficult to treat in humans, such as ovarian or pancreatic cancer in a terminal stage.

Kwamena Baidoo, scientist at the U.S. National Cancer Institute

The most delicate operation is to bind radioactivity with an element able to detect cancer cells. The goal is to kill all of them.

Guillaume Debré [off camera]

The results of these pre-clinical tests are astonishing. All of the mice who did not receive the radio immunotherapy treatment died within three weeks. Half of those who received the treatment doubled their life expectancy. Twenty percent of them survived the cancer.

Martin Brechbiel

What this shows here is that we have total control of the radioactive element. This means we can focus our treatment to destroy the tumor completely.

Guillaume Debré [off camera]

U.S authorities are expected to approve clinical trials on man in a few months. This will be the last step to transform this promise into treatment.

Martin Brechbiel

Our tests show that these treatments can destroy tumors that are immune to surgery and chemotherapy. And it prevents certain types of cancer from recurring. There will be a major impact if we can replicate these results in human trials.

Guillaume Debré

Treatment will not be available until 2014. Five long years to wait, but with them hopefully the promise of a new therapy to fight cancer.