

The achievements of the Synergie Lyon Cancer Foundation seen by Patrick Mehlen, Marina Rousseau-Tsangaris and Gilles Salles

Prof. Patrick Mehlen- Deputy Director of the Cancer Research Centre of Lyon (CRCL)

We are currently witnessing a radical change in patient management and cancer treatment.

Henceforth we try to treat patients for their own cancer rather than a type of cancer, such as lung cancer or pancreatic cancer.

At present, only five or six targeted therapies are possible. So we're far from being able to treat all the mutations of a cancer as there are many more.

However, within a timeframe of ten years, the objective is that when a patient arrives at a healthcare establishment such as the Léon Bérard Centre or the Hospices Civils de Lyon, we'll be able to take a small part of their tumor for a biopsy and perform extensive characterization. We'll be able to see what mutations are involved and know, for example, if their immunity is functional.

Depending on the characterization, it will then be possible to choose one or more treatments from a catalogue of targeted therapies aimed at a mutated protein or gene in the cancer to be treated.

The whole purpose of the Synergie Lyon Cancer Foundation is therefore to compile a catalogue of 200 targeted therapies within the next ten years. To achieve this, the Foundation performs research of excellence by attracting the best researchers to Lyon.

The Foundation's facilities permit setting up a continuum that ranges from fundamental research to clinical research and the treatment of patients. The research of excellence, begun with the arrival of high level researchers, leads to the discovery of new mutated pathways in cancers. This will allow us to formulate candidate drugs (the C3D drug discovery center, is designed to make available new compounds) and then test these compounds on animals in the Tumor Model Laboratory. The candidate drugs will then be subjected to clinical tests on patients whose cancerous mutations have already been characterized by the Bioinformatics Centre.

Dr. Marina Rousseau-Tsangaris, General Secretary of Research at the Léon Bérard Centre (CLB)

Although it is now possible to analyze and better characterize tumors, we also generate thousands of results. Our challenge is to structure these results, analyze them and answer the questions they raise.

Bioinformatics is a highly specific expertise, a mixture between biology, computing and mathematics. We can also call on experts from other disciplines, such as biostatisticians, to work with us to analyze and process these results so that, eventually, we can better understand the cancer concerned and the disease.

Gilles Salles, Professor of Hematology and Head of the Hematology Department at the Hospices Civils de Lyon

The first effort made by the Synergie Lyon Cancer Foundation was to set up a bioinformatics center with Professor Gilles Thomas, who joined us from the United States. He's built up an entire team that is totally dedicated to the effort in close collaboration with researchers in computer analysis.

Dr. Marina Rousseau-Tsangaris

Thanks to its resources and flexibility, the Foundation was able to bring Professor Gilles Thomas to Lyon, to set up and implement the Bioinformatics Centre.

Prof. Gilles Salles

There aren't many centers of this type in France, although others have been developed since. The Foundation's Bioinformatics Centre is a unique asset in the array of facilities dedicated to cancer research, through the links that its team has forged with the other research teams, and through the advances it permits today.

Dr. Marina Rousseau-Tsangaris

After five years of operation, this center has proven to be a genuine success. It employs ten very high level researchers, and it permits working in synergy with the clinicians.

Prof. Gilles Salles

The second facility that the Synergie Lyon Cancer Foundation has developed for the scientific research community of Lyon is the Tumor Model Laboratory (LMT). The objective of the LMT is to reproduce in animals tumors that occur in human beings, so that we can study the behavior of tumors in living organisms while conforming to all the usual ethical rules applicable to experiments using animals.

Dr. Marina Rousseau-Tsangaris

The aim is to mimic human tumors as closely as possible so we can understand them better on the one hand, and test new drugs and observe their effects on tumors on the other.

Prof. Gilles Salles

Obviously, the center is very useful for therapeutic targeting since it allows carrying out proofs of concept (editor's note: the stage at which proof is obtained that a concept/idea/project/prototype can have an application that functions/can be developed further). We obtain the certainty that taking a scientific direction or selecting a specific target in the animal is useful. We can then progress with the idea that a drug could be useful for human beings.

This reasoning naturally leads us to the third facility which is the Centre for Drug Discovery and Development (C3D). It uses other techniques such as high throughput screening which, depending on the discoveries made by researchers on key mechanisms, identify the substances and future drugs capable of blocking the development of a cancer.

Dr Marina Rousseau-Tsangaris

The discoveries made in our fundamental research laboratories are far upstream in the research process. Thus this provides us with greater power to attract different partners, whether industrial or academic, with whom we can work to develop new drugs.

Prof. Gilles Salles

However, Drug Discovery is not as simple as it sounds.

It involves highly advanced technology and knowhow that have to be implemented as a function of the abnormality observed by the researchers. Efforts must be devoted to specific families of molecules, to a specific catalogue of molecules that can be used to combat the abnormalities detected. It is another original tool that, with the other facilities of the Synergie Lyon Cancer Foundation, permits exploiting the whole chain of knowledge.

We start with bioinformatics which helps us to analyze abnormal mechanisms in cancer cells. The mechanism is then validated in an experimental model, after which we try to find drugs or substances capable of acting as future drugs, test them in tumor models and finally arrive at the point of developing new drugs to combat cancer.

It's a long path that cannot be travelled in a day or a month, but the tools created by the Synergie Lyon Cancer Foundation provide the scientific community of Lyon with a highly efficient array of resources to accelerate research for the benefit of the patient.