



Center for Cell Therapy and Regenerative Medicine (CCRG)

UZA foundation

What is CCRG?

CCRG is a **multidisciplinary platform** for new types of **cellular therapy** and **tissue therapy**. It is located on the campus of the Antwerp University Hospital (UZA). This platform enables **research, production** and **clinical implementation**.

Research is offered to patients as experimental therapy via clinical studies. This allows us to help patients for whom conventional therapies, such as chemotherapy and radiation therapy, do not provide enough adequate solutions. The results of the clinical research help us to decide on our research strategy. This interaction, which is based on the approach of translational medicine, ensures that we follow the best path in the development of new, innovative and **pioneering concepts**.



What does CCRG do?

The center is a one stop shop for the **development, production** and **clinical implementation** of Advanced Therapy Medicinal Products (ATMP).

Because of the center's production and clinical implementation activities, it is absolutely essential to be **accredited by the Federal Agency for Medicines and Health Products** (FAGG/AFMPS/FAMHP). UZA is the first academic center in Belgium to have developed this expertise – and in February 2015 it became the first such center to obtain this accreditation.

Cellular immunotherapy

One of the major problems in the fight against cancer is resistance to currently available treatment and the aggressive recurrence of the disease due to remaining therapy-resistant cancer cells. **Immunotherapy uses the patient's own immune system to fight cancer.** It can help supplement the classical treatment modalities (surgery, radiotherapy, chemotherapy) and can increase the response rates, disease-free survival and overall survival of cancer patients.

Prof. Zwi Berneman and his team have long been at the forefront of developing new and **clinically safe technologies** for cancer immunotherapy and their application in patients.

In cooperation with the Laboratory of Experimental Haematology of the University of Antwerp and the Division of Haematology at UZA, Prof. Berneman's laboratory pioneered a clinically safe gene transfer methodology in which the message for tumour-associated and tumour-directed proteins is introduced into immunity cells using a mild electric shock.



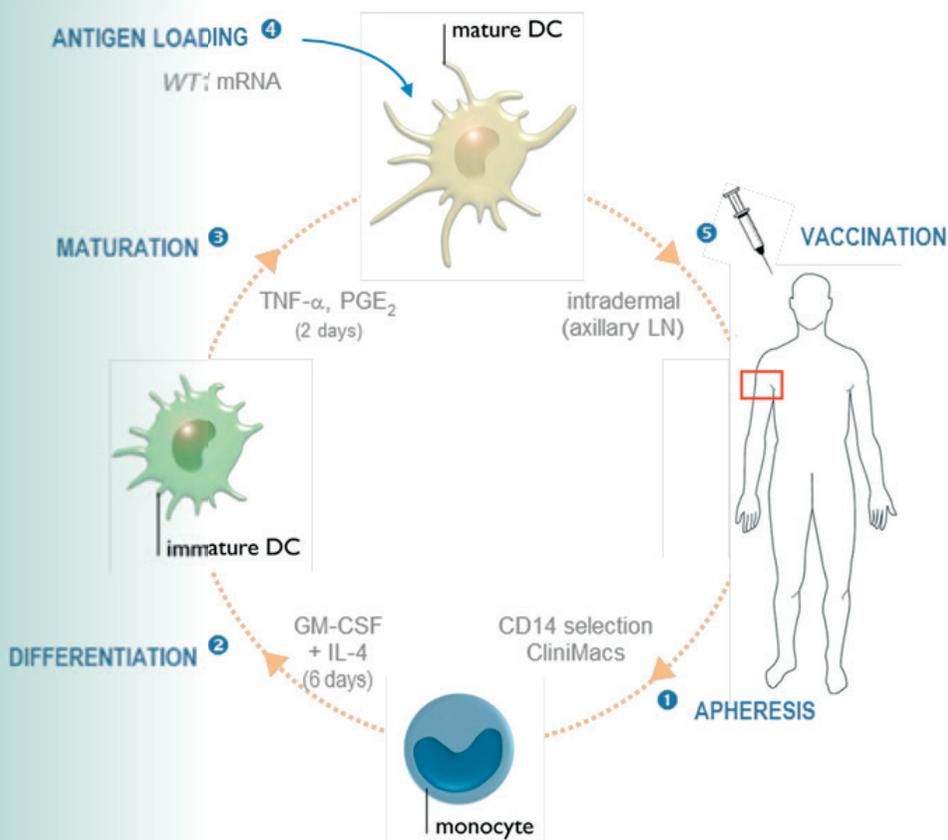
*Prof. Zwi Berneman
Medical Director of CCRG*

This method of using **messenger RNA (mRNA) electroporation is being utilised to engineer dendritic cells**, the conductors of the immune system, so that they can boost the immune response of patients against the cancer itself.

“Prof. Zwi Berneman has more than 25 years of experience in cellular biology and cancer technology.”

What is cellular immunotherapy?

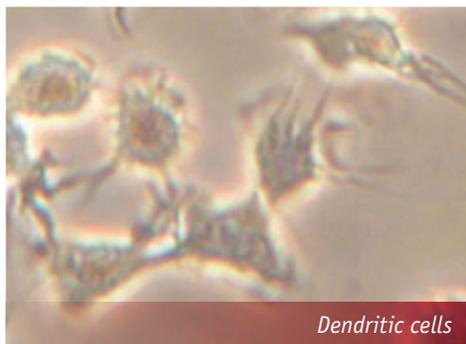
In this therapy, white blood cells from a patient's own immune system are armed to fight a disease. A diagram of **dendritic cell vaccination**, one form of cellular immunotherapy, is shown below. In practice, this involves isolating cells from the patient following a blood collection (step 1). These cells are cultured in CCRG's cell therapy facility (steps 2 & 3) and modified using electroporation (step 4). They are then injected in the skin of the patient (step 5).



Results of dendritic cell vaccination for acute myeloid leukaemia

The concept that Prof. Zwi Berneman developed together with his team has proven its efficacy. The medical effect of the concept has been demonstrated in 43% of the leukaemia patients treated. Relapse rate was reduced by 25%. Overall survival was prolonged by a factor of almost two.

This happened in a comfortable way for the patient, without the side effects of conventional cancer treatments such as radiotherapy and chemotherapy.



Dendritic cells

— FROM A PATIENT WHO WAS TREATED WITH DENDRITIC CELL VACCINATION —

“Thanks to the combination of chemotherapy and immunotherapy, I was completely cured of leukaemia nine years ago. In addition to the excellent professional medical care I received, I was very impressed by the personal mental support they provided. I still have good contact with the medical team today.” — (Frank Bal, 58 years old)

- Outcome of dendritic cell vaccination for acute myeloid leukaemia:
 - > Relapse was prevented in 25% of patients
 - > Side effects were very limited - not a single case of severe toxicity occurred

But this promising research goes much further!

The initial clinical studies show that dendritic cell vaccines are personalised, but **can be applied generically**. Clinical trials conducted in collaboration with the Division of Oncology at UZA, strongly suggested a prolongation of overall survival for other types of cancer, including **brain tumours** and **pleural cancer**.

Further research is needed – not only to be able to help patients with other types of cancer, but also to improve the efficacy of the therapy. Concepts for this are available, but must be developed further to eventually be implemented through clinical trials.

The pioneering work of CCRG has already had an impact in cancer patients. Top centers in immunotherapy are already collaborating with CCRG.

“Top centers in immunotherapy are already collaborating with CCRG.”

more than
1500
personalised
vaccines

more than
110
cancer patients
treated

up to
x2
extended
survival



Prof. Dr. Haruo Sugiyama

— FROM A COLLEAGUE —

Prof. Dr. Haruo Sugiyama, University of Osaka Graduate School of Medicine (Japan):
“For many years, my group at the University of Osaka and I have been collaborating with Prof. Berneman and his group at the Center for Cell Therapy and Regenerative Medicine (CCRG) of the Antwerp University Hospital. This collaboration has been beneficial for both our groups. It has led to groundbreaking developments and has given a significant boost to the field of cancer immunotherapy. Together, we are currently developing a new technology in cellular immunotherapy, which we hope to be able to bring to the clinic to treat cancer patients.”

And this is only the beginning!

The concept developed for immunotherapy in the fight against cancer now appears to also be applicable to the treatment of **autoimmune diseases**. According to a similar concept, this involves culturing and loading dendritic cells from the patient and then administering them as a vaccine, with the aim to decrease the activity of the immune system in a disease-specific manner.

The results of in vitro tests, performed at CCRG and of experiments in mice, conducted in the laboratory of Prof. Dr. Eva Martinez-Caceres at the University of Barcelona (Spain), were so positive that a first clinical trial for patients with multiple sclerosis will be carried out at UZA in 2017. ***A world first!***

This opens a whole new domain of potential medical applications in the field of autoimmune diseases (besides multiple sclerosis, we are also considering **Type 1 diabetes**, for example). Dendritic cell vaccines could finally offer the possibility of a real, effective cure or long-term control for this type of diseases for which, to date, only non-curative treatments are available

Support this pioneering work

You can support research with an important impact on the healthcare of the future.



*Prof. Zwi Berneman
and his team at CCRG*

Objectives for 2017-2020

— Increase the efficacy of cancer immunotherapy through translational research (focus on leukaemia, brain tumours and pleural cancer):

- > Research team
- > Clinical trials
- > Accreditation – expertise

— Translational research for autoimmune diseases (focus on multiple sclerosis)

“Support this research with an important impact on the healthcare of the future.”

Extra resources needed for 2018

300 k€

fundamental
research

210 k€

clinical
trials

95 k€

infrastructure

Contact

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