

THIERRY BOON-FALLEUR

My field is cancer genetics and immunology.

I studied biology and medicine for 3 years at the University of Louvain, but I never completed the medical curriculum because I moved to Rockefeller University, New York, to pursue a doctorate in the field of molecular genetics.

Later I moved to the Pasteur Institute in Paris. There, in 1972 I made a fortuitous observation. It suggested that mouse tumors that were not rejected by the immune system nevertheless carried specific antigens that had the potential to serve as targets for rejection by T lymphocytes, provided proper immunization could be applied. Starting from this observation, we applied the approaches of molecular and cellular genetics to the field of tumor immunology. This led to the demonstration that our initial observation applied to all mouse tumors. Moreover, the genetic mechanisms that lead to the expression of tumor-specific antigens were elucidated. These are mutations of ubiquitously expressed genes and reexpression in cancer cells of genes that are only expressed in germline cells. One conclusion of this work is that the T lymphocytes can exert an immuno-surveillance of the integrity of our genome: genetic defects lead to the expression of new antigens that can serve as targets for the destruction of the cell by T lymphocytes.

The observations made on mouse tumors have been extended to human tumors: it is now clear that most, if not all, human tumors carry tumor-specific antigens. As it is equally clear that tumors do not elicit an effective immune rejection response, we are engaged in a program of therapeutic vaccination of cancer patients, mainly melanoma patients, using purified antigens known to be expressed on their tumor. At the present time this treatment induces some degree of tumor rejection in only 20% of the patients. Medically significant rejections are only observed in 10% of the patients. Our present approach is to compare systematically the T lymphocyte responses of the few patients who reject their tumor to the responses of the many who do not, in order to identify critical differences. Hopefully, this will enable us to improve our treatments.

My research is being pursued at the Brussels branch of the Ludwig Institute for Cancer Research, at the Christian de Duve Institute of Cellular Pathology and at the Faculty of Medicine of the University of Louvain in Brussels.