## EL PAIS

## **IN ENGLISH**

## INTERVIEW

## "Cancer is the price we pay for life"

Dr Joan Massagué's recent work has identified some of the genes responsible for the capacity of breast cancer cells to metastasize into bones and lungs

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Cancer researcher Joan Massagué in Barcelona. / GORKA LEJARCEGI

Dr Joan Massagué, chairman of the Cancer Biology and Genetics Program at the Memorial Sloan-Kettering Cancer Center, New York, has spent his career in the United States, moving there in 1979 at the age of 26, shortly after completing his Ph.D. Since then he has worked primarily on metastasis, the devastating capability of cancer cells to migrate from the primary tumor and generate new tumors elsewhere in the body.

In the 1980s, as faculty member at the University of Massachusetts Medical School, Massagué took up the study of a group of natural substances, termed "transforming growth factor-betas" (TGFßs), documenting their effects on cells and tissues.

Massagué's recent work has identified some of the specific functions and genes responsible for the capacity of breast cancer cells to metastasize into the bones and lungs. These studies are opening new avenues for the investigation and treatment of metastatic cancers. In recognition of his achievements, Massagué has been awarded Spain's Prince of Asturias Prize, the Clowes Memorial Award, the Frontiers of Knowledge Award in Biomedicine, the Vilcek Prize in Biomedical Science, and the Passano Prize.

As well as his position at the Memorial Sloan-Kettering Cancer Center, Dr Massagué is investigator of the Howard Hughes Medical Institute, professor of the Weill-Cornell Graduate School of Medical Sciences, and vice director of the Barcelona Institute for Research in Biomedicine.

He is also a member of the National Academy of Sciences, the American Academy of Arts and Sciences, the Institute of Medicine, the Spanish Royal Academies of Medicine and Pharmacy, and the European Molecular Biology Organization.

Question. What is a tumor?

**Answer.** The anomalous growth of our tissue. Our bodies are a society of trillions and trillions of highly organized cells. Alterations,

or mutations, can be caused by many things: the sun, tobacco, or inherited from our parents; they can also be acquired accidently; there are also cells that simply do not respect the rules prescribed by our genes over hundreds of millions of years.

Q. So cancer is a rebellion of the cells...

**A.** Yes. But these cells rebel at great cost. Because when a tumor begins to develop, the majority of these malign cells die. The tumor we see and that so terrifies us is made up of the survivor cells of that process, but for each of these there are millions that we never see because once they grow to around half a millimeter in size, they are liquidated by the body's

Historically, Spain has shown no interest in research" police, which is the immune system. But some cells survive. And that is a tumor: the final result of a brutal selection process against the rebellion. While we are having breakfast, we are generating pre-malign cells; by lunchtime, they no longer exist. That's why we say that as long as there is life, there will be cancer. It's the price we pay for being alive.

Q. Are there good cells and bad cells?

**A.** Yes. The principal manifestation of bad cells is cancer. They are corrupting elements that have managed to trick their way past our surveillance devices overseen by the body's police. Just like in human society. We now know, after many years' work, that the main talent of these bad cells is their ability to form a tumor, to corrupt the body.

**Q.** At the risk of sounding flippant, I can see the corruption analogy in Spanish society. Tumors are a kind of prison where the bad cells have been locked up...

A. Exactly.

**Q.** Are you aware that many people hold you up as a saint? Do you feel a terrible responsibility knowing that so many sick people depend on you and others like you?

**A.** I'm not a saint, and I can't think like that. I can't live every day with the idea that 250 million people are hoping that we'll find a cure for cancer.

**Q.** Somebody with cancer once told me: "Don't worry; I'm going to beat this." Soon after, he died. When you're working in the lab, do you say the same kind of thing?

**A.** I can only speak for myself. Other researchers are more distanced from their work, and some are so involved that they are effectively paralyzed. And a researcher paralyzed by the enormity of their mission is no use. I am aware that this is a war, so all I can do is keep fighting the enemy.

Q. You have accused Spanish governments of a "ferocious indifference toward research."

**A.** Historically, Spain has shown no interest in research, but over the last decade, the idea of a knowledge society and the use of high technology has begun to take root. Our governments finally started to realize that a country cannot live on good food, sunshine or the property sector alone. Spain made great strides over the course of seven or eight years. But at the first sign of an economic downturn, we forgot the importance of research. Our governments do not seem to understand that when you reduce investment in research, you inflict qualitative damage [on the science sector]. Research without resources means an overall drop in standards toward mediocrity. It creates its own dynamic, and we accept the idea of mediocrity, and in so doing we end up losing our morale. That is where we are right now. It is at times of difficulty that leaders emerge. Spain has to decide if it wants to be a leader or a follower

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