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## Why Some Cancers Become Malignant and Others Don't

*Cancer cells reproduce by dividing in two, but a molecule known as PML limits how many times this can happen, according to researchers led by Dr. Gerardo Ferbeyre of the University of Montreal's Department of Biochemistry. The team showed that malignant cancers have problems with this molecule, meaning that in its absence they can continue to grow and eventually spread to other organs. Importantly, the presence of PML molecules can easily be detected, and could serve to diagnose whether a tumor is malignant or not.*

"We discovered that benign cancer cells produce the PML molecule and display abundant PML bodies, keeping them in a dormant, senescent state. Malignant cancer cells either don't make or fail to organize PML bodies, and thus proliferate uncontrollably," Ferbeyre explained. Senescence is the mature stage in a cell's life at which it can no longer reproduce and it is a natural defense against cancer formation. When tumor cells are benign, it means that they cannot spread or grow into other parts of the body.

The team of researchers based both on campus and at the University of Montreal Hospital Research Centre built on Dr. Ferbeyre's prior discovery that PML is able to force cells to enter senescence. However, for the past ten years, the mechanism by which this was achieved remained mostly unknown. Hospital researchers worked with patients to collect samples that enabled the team to make their discovery.

"Our findings unravel the unexpected ability of PML to organize a network of tumor suppressor proteins to repress

the expression or the amount of other proteins required for cell proliferation," explained researcher Véronique Bourdeau. Such proteins are essential molecules in our body that play a key role in controlling the birth, growth and death of cells. Researcher Mathieu Vernier emphasized that "this is an important finding with implications for our understanding on how the normal organism defends itself from the threat of cancer."

The work offers exciting avenues for future research. "Our discovery opens new possibilities to explore what other molecules are involved in generating senescence: a goal we consider important if we want to design therapies that turn malignant tumors into benign tumors," Ferbeyre said. The research was published on January 1, 2011 in *Genes and Development*, and received funding from the Canadian Cancer Society and by the Fonds de la recherche en Santé du Québec.

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