

A Cell-Cell Communication Code Reveals the Fitness of a Cell to its Neighbours

Madrid, June 16th, 2010 – Scientists of the Spanish National Cancer Research Centre (CNIO) discover a protein called Flower that marks the weaker cells for elimination in favour of their fitter neighbours.

Eduardo Moreno, from the Cell Competition Group at the CNIO, has published a study in the June 15th issue of the prestigious journal *Developmental Cell* that furthers our understanding of the developmental process of "cell competition" and may provide some insight into pathological conditions that involve imbalances in cell fitness, such as cancer. Christa Rhiner, Jesús M. López-Gay, Davide Soldini, Sergio Casas-Tinto, Francisco A. Martín, and Luis Lombardía also participated in the study.

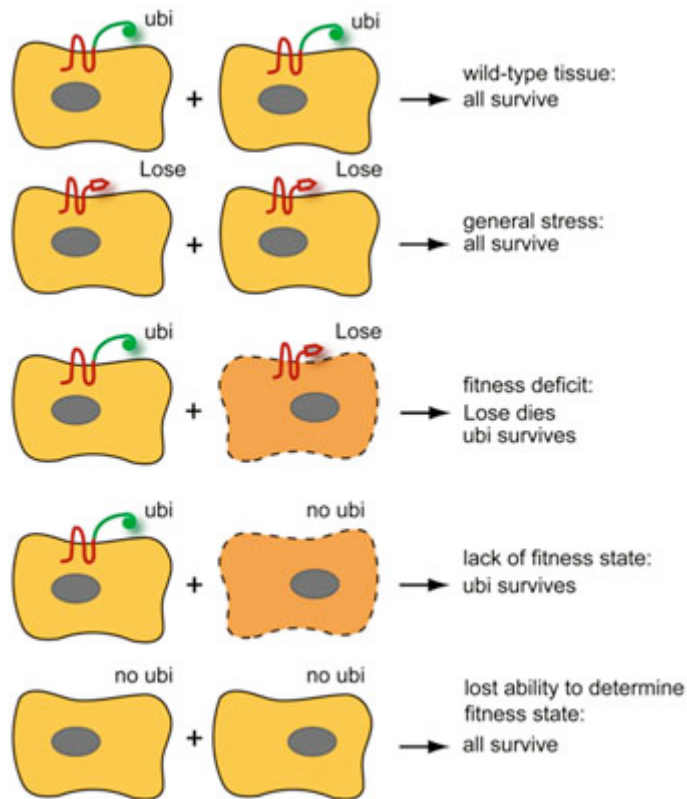
During development, a cell compares its metabolic rates with neighbouring cells and, as a result, the best adapted cells "win" and proliferate at the expense of neighbours that "lose" and are eliminated. This process of cell competition was first described in the fruit fly, in larval structures called imaginal discs that give rise to adult body parts, such as the wings. Cell competition may serve as a way to ensure that only the fittest cells contribute to the growing organism. However, all the known regulators of cell competition are also known to affect cell growth and survival in general, so it has been hard to determine what benefit animals derive from this particular type of cellular melee.

"We were interested in investigating how cells of fly wing imaginal discs distinguish winners from losers during cell competition," explains senior study author, Dr. Eduardo Moreno. "We took a genomic approach and combined it with functional assays in order to identify genes expressed early during cell competition."

Dr. Moreno's team identified several factors involved in the process, including Flower, a protein found in the cell membrane of multicellular animals. They show that three different forms of the Flower protein act as cellular "tags" that weigh in on win/lose decisions. A specific Flower tag not only labels cells as losers but triggers their elimination by apoptosis, a type of genetically programmed cell death. In fact, Flower is required for cell competition to occur, but does not affect general cell growth and survival.

"Taken together, our results suggest that Flower isoforms generate the scaffold that is required and sufficient to label cells as winners and losers during competitive interactions among cells," concludes Dr. Moreno. "The extracellular code composed by the Flower isoforms may have biomedical implications beyond cell competition because imbalances in cell fitness also appear during

ageing, cancer formation and metastasis." Indeed, the specific role for Flower in cell competition makes it a unique focus for future study to understand the function of cell competition in isolation from other signals that control tissue growth.



For the full article, please see:

<http://www.cell.com/developmental-cell/home>