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Researchers from IMIM describe a new function of two molecules involved in metastasis

Transcription factor Snail1 and enzyme LOXL2 are key to the capacity of tumor cells to invade other tissues

LOLX2 is confirmed as a therapeutic target to impede cancer from developing

Barcelona, 11th November, 2013 – Researchers from IMIM (Hospital del Mar Medical Research Institute) lead by Dr. Sandra Peiró have described a new function for two key molecules involved in tumor progression. Transcription factor SNAIL1 and enzyme LOXL2 are essential to Epithelial-Mesenchymal Transition (EMT); meaning the process by which tumor cells are able to move and reach other tissues. The study has been published in the *Molecular Cell* Journal and places enzyme LOXL2 as a possible therapeutic target to treat cancers such as breast, lung or skin cancer.

Transcription factors are proteins that regulate gene expression. They activate or deactivate a gene's function. Researchers at IMIM have studied the function of one of these transcription factors, Snail1, in mouse cells during the Epithelial-Mesenchymal Transition (EMT). Sandra Peiró, a researcher from the IMIM Research Group on Epithelial-Mesenchymal Transition and Tumor Progression explains: "***EMT is a process consisting of converting epithelial cells, the ones covering the internal and external surfaces of the body, into what are known as mesenchymal cells. In this process, the cells acquire a series of new characteristics that enable them to migrate and resist apoptosis (programmed cell death), self-regenerate and, finally, invade neighboring tissues and reach other areas of the body. When this process occurs at the tumor epithelial cells, the resulting mesenchymal cells can migrate and generate metastases***".

The study shows that during the transformation into mesenchymal cells, DNA, folded in to chromatin cell, must then become reorganized to adapt to the now cell functions. Transcription factors Snail1, through LOXL2 is in charge of this transformation. Therefore, any mechanism that is able to block it would prevent Epithelial-Mesenchymal Transition and thus a metastasis. "***Our research is basic, and therefore, our findings cannot be applied immediately, but the fact that LOXL2 is a key element in the process and an enzyme makes it a firm candidate to be a therapeutic target, since its activity can easily be inhibited or blocked with the right drugs***", says Sandra Peiró.

Previous studies by this group had described, for the first time, that LOXL2 was present at the cell nucleus and played a key role in tumor development. These new outcomes show that the functions of the genome are found to go far beyond the simple DNA sequence and that, therefore, it is necessary to integrate all levels of regulation to understand genome regulation. Right now, the challenge for the researchers is to study how the genome is organized spatially during a vital process in the development of cancer as EMT.

Reference article:

"*Regulation of Heterochromatin Transcription By Snail1/ LOXL2 During Epithelial to Mesenchymal Transition*". Alba Millanes-Romero, Nicolás Herranz, Valentina Perrera, Ane Iturbide, Jordina Loubat, Jesús Gil, Thomas Jenuwein, Antonio García de Herreros, and Sandra Peiró. ***Molecular Cell.***

Further information

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