**Methylation decrease of *BECN1* gene induced by phytochemical Indicaxantin in Caco2 cells: an epigenetic hypothesis of autophagy**

Chiara La Rosa*, Flores Naselli, Carla Gentile, Ilenia Cruciata, Alessandro Perez, Roberto Chiarelli, Luisa Tesoriere, Maria Antonia Livrea, Fabio Caradonna

*Dipartimento di Scienze e Tecnologie Biologiche Chimiche e Farmaceutiche, Università di Palermo*
**Email*: chiara.larosa.88@gmail.com

Autophagy is a highly conserved catabolic process that degrades and recycles intracellular components through the lysosomes [1]. The role of this process in tumorigenesis and tumor progression is controversial: in the early stages, it can block tumor growth and conversely it can promote its progression in the later stages [2]. The tumor suppressor *BECN1* gene, encodes the protein Beclin 1, a marker of autophagy down-regulated in several types of cancer, such as colorectal cancer [3]. There are a lot of both genetic and environmental risk factors for colorectal cancer, including diet: for this reason, in accordance with epidemiological studies, consumption of foods rich in phytochemicals is widely promoted.
The betalain indicaxantin (Ind) is a phytochemical from the Opuntia Ficus-Indica fruit having several biological activities, such as antioxidant, anti-inflammatory. It showed antiproliferative and proapoptotic effects in colorectal adenocarcinoma (Caco2) cells where was able to regulate gene expression through modulation of methylation state of DNA at CpG islands [4].
For the first time, using Methylation-Sensitive Restriction Endonuclease PCR (MSRE-PCR), we report that Ind (50 e 100 µM) decreases the methylation of *BECN1* promoter in Caco2 cells, to the same extent as 5-azacytidine (Zcyd, positive control). Interestingly, colorimetric detection of DNA Methyltransferases activity, indicates that Ind reduced the activity of these enzymes, like Zcyd did.
These preliminary data, indicating that Ind is able to decrease the methylation of *BECN1* gene, allow us to propose an epigenetic hypothesis of autophagy regulation in Caco2 cells.

**References**

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