

Scientists discover that self-eating cells safeguard against cancer

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Scientists at Trinity College Dublin have made an important discovery concerning how fledgling cancer cells self-destruct, which has the potential of impacting on future cancer therapies. The Trinity research group, led by Smurfit Professor of Medical Genetics, Professor Seamus Martin and funded by Science Foundation Ireland, has just published their findings in the internationally renowned journal, *Molecular Cell*.

Professor Martin's team has discovered how a process called 'autophagy' – which literally means 'self-eating' – plays an important role in safeguarding against the development of cancer. The discovery highlights an unexpected role for a killer protein, called Noxa, in triggering the self-eating process that leads [cells](#) in the early stages of cancer to literally eat themselves to death.

Normally, the process of autophagy is switched on when cells experience periods of starvation and in this context is beneficial by helping to keep the 'wolf from the door' until food reappears on the menu. However, the Martin laboratory has discovered that mutations in a gene called Ras, which is involved in approximately 30% of human cancers, triggers excessive autophagy leading to auto-destruction of the fledgling tumour cell. Mutant Ras was found to switch cells into the self-eating mode by ramping up the production of Noxa. The study suggests that autophagy represents an important natural safeguard against cancer development.

Importantly, the Trinity team also discovered that members of the Bcl-2 gene family could override this process, switching off the self-eating

process and leading to survival of cancerous cells. This suggests that drugs targeting Bcl-2 might reactivate the natural self-destruction pathway and help to shrink tumours. The fact that mutant Ras triggers self-destruction of cells carrying this gene also helps to explain why the emergence of fully cancerous cells is relatively rare when we consider that the average human makes hundreds of billions of cells over the course of their lifetime.

Commenting on the findings, Professor Martin stated: "This discovery is an important step forward in our understanding of how cells in the early stages of cancer hit the autodestruct button and suggests new ways in which we may be able to re-activate this process in cancers that do manage to establish. This breakthrough has led directly from investment in research made by the Irish state over the past 10 years through important initiatives such as the establishment of Science Foundation Ireland."

The work was carried out in the *Molecular Cell* Biology Laboratory at TCD's School of Genetics and Microbiology by the research team led by Professor Martin and funded primarily through a major award from Science Foundation Ireland. The TCD research team is internationally recognised for its work on cell death control in [cancer](#) and immunity.

Provided by Trinity College Dublin

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