

Scientists provide important insight into apoptosis or programmed cell death

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A study by Nanyang Technological University (NTU)'s Assistant Professor Li Hoi Yeung, Assistant Professor Koh Cheng Gee and their team have made an important contribution to the understanding of the process that cells go through when they die. This process known as 'apoptosis' or programmed cell death, is a normal process in the human body which removes perhaps a million cells a second.

According to Professor Li, they discovered that during apoptosis, the cell's rescue mechanism is inhibited when certain proteins (i.e. 'anti-factors' that are necessary to keep a cell alive) are no longer able to enter the cell's nucleus, thus stopping the cell's ability to initiate its self-repair process.

In addition, they also discovered that the protein RanGTP, which is involved in the transportation of certain proteins into and out of the cell's nucleus, is reduced greatly during the early stages of apoptosis.

Under normal circumstances, there is a high distribution of RanGTP in the nucleus and a low concentration of RanGTP in the [cytoplasm](#) (the body enveloping the cell's nucleus). It is this gradient of RanGTP that exist across the nuclear-cytoplasmic boundaries that serves as a track and directs the transport of proteins and other molecules into and out of the nucleus. Hence, when the concentration of RanGTP is reduced in the nucleus, the RanGTP gradient collapses and the nuclear transport machinery subsequently shuts down.

Too little or too much apoptosis plays a role in a great many diseases. When [programmed cell death](#) does not work right, cells that should be eliminated may linger around and become immortal - for example, in cancer and [leukemia](#). When apoptosis works overly well, it kills too many cells and inflicts grave [tissue damage](#). This is the case in strokes and neurodegenerative disorders such as Alzheimer, Huntington and Parkinson diseases.

While it is established that cells undergo apoptosis when they are damaged by mechanical injury, exposed to death stimuli, or under stress, the mechanism that initiates apoptosis has not been comprehensively resolved. Thus the study by Professor Li, Professor Koh and their team at NTU have provided new insights on the process that cells go through while experiencing apoptosis.

The team has written a paper that was recently published in *Nature Cell Biology*.

Source: Nanyang Technological University ([news](#) : [web](#))

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