

Apoptosis. You Can't Live Without It

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Our bodies are truly amazing. Nature is extremely wise in its design and functioning.

One of the important mechanisms that nature uses to the body's advantage is that of apoptosis. Apoptosis is a form of programmed cell death. It is a natural process of self-destruction in cells, allowing for a turnover of cells and removal of those cells that are damaged. Apoptosis occurs in the body on an ongoing basis with approximately 50-70 billion cells killed each day in the average human adult and 20-30 billion cells per day in a child.

Apoptosis can occur when a cell is damaged beyond repair, infected with a virus or when undergoing stress. The 'decision' for apoptosis can come from the cell itself, from the surrounding tissue or from a cell that is part of the immune system. There are a variety of cell signals that play a role in apoptosis ranging from hormones to growth factors and even an inner cellular response to stress resulting in cell suicide. The process of apoptosis functions to remove the damaged cell, preventing it from sapping further nutrients from the body as well as preventing the spread of a viral infection.

Apoptosis is an essential part of the development and maintenance of the body. One of its roles is in preventing cancer. We all have errant cells in the body such as cancer cells. No one is immune. It is part of the natural mechanism of a healthy immune system, however, to identify these unhealthy cells and remove them from the body. When functioning properly, the body induces apoptosis to rid the body of cancer cells.

The number of cells in our body is kept relatively constant through cell death and division. Cells must be replaced when they become diseased or are malfunctioning and the production of new cells must be compensated by cell death. This balancing act is part of the homeostasis required by living organisms to maintain internal states. It is a continuous happening in the body: errant cells taken out and new, healthy cells made.

If this homeostatic mechanism is disrupted, disorders can occur. If the cells are dividing faster than they die, a tumor is the result. If the cells are dividing slower than they die, the result is cell loss. With defective apoptotic pathways, cells can live past their 'use-by-date' and are then able to pass along faulty messages, increasing the possibility of the cell becoming cancerous or diseased.

So what enhances apoptosis and what can cause disruption in the natural mechanism of apoptosis? (see "Apoptosis continued" written on 3/21/08)

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