ABSTRACT

Caspases provide anti-inflammatory, apoptotic and developmental processes in organisms. They are enzymes with a wide range of activities in all cells, and various pathogeneses can occur if their proper function is disturbed. Since the 1990s, caspases have been a topic of interest for scientists, as their direct link to the triggering of apoptotic processes is a promising possibility for the therapy of diseases related to apoptosis, such as cancer, neurodegenerative diseases, but also cardiac ischemia and diabetes. The cascade of apoptotic processes is controlled by the aforementioned caspases, which are located in the caspase cascade. When the cascade is triggered in a cell, it is due to the presence of a "danger" signal, which can be very different. The most well-known triggers of the apoptotic cascade include activated Fas receptor and FasL ligand, cytochrome c present in the cytoplasm, an imbalance of IAPs in the cell, damaged DNA, and many others. Upon receipt of a signal, initiator caspase-2, caspase-8, and caspase-9 are activated, which in turn activate effector caspases-3, caspase-6, and caspase-7, cleaving many substrates to promote apoptosis. Thus, caspase-3 is the effector enzyme responsible for the actual execution of apoptosis.

However, caspase-3 properties are not only apoptotic, it is also involved in cell proliferation, regeneration and differentiation. Caspase-3 and its inhibitors can be used to suppress or treat apoptosis-related diseases.

Key words: caspase-3, apoptosis, proliferation, cancer, neurodegenerative disease