Mitogenic Regulators and Targets for Drug Development

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Technology description

Technical Summary

Reactive oxygen intermediates (ROI) are generated during an oxidative process that occurs in many cell types. The result of generating reactive oxygen is the formation of superoxide, with a secondary formation of hydrogen peroxide. ROI's are also considered to be an accidental byproduct of metabolism, particularly mitochondrial respiration. ROI are cytotoxic and mutagenic, which allow them to modify and damage critical biomolecules, including DNA. Growing evidence suggests that there is generation of ROI by non-phagocytic, particularly in situations related to cell proliferation. Additionally, ROI appear to have a direct role in regulating cell division and may function as mitogenic signal in pathological conditions related to growth. These conditions include, but are not limited to, cancer, cardiovascular disease and angiogenesis. Superoxide and hydrogen peroxide are also proposed to function as "life-signals," which prevent cells from undergoing apoptosis.

Dr. Lambeth and his colleagues have discovered a novel family of nucleotide sequences and proteins encoded by these nucleotide sequences, and include several Nox proteins and Duox proteins. It has been shown that Nox proteins are involved in ROI production. The present invention describes vectors containing the nucleotide sequences, cells transfected with these vectors that contain these nucleotide sequences or fragments thereof, and antibodies to these proteins and fragments for Nox 2 and Duox 1 and 2. The nucleotides and antibodies are useful for the detection, localization and measurement of the nucleic acids encoding for the production of the proteins and the proteins themselves. Additionally, a method for regulation of cell division or proliferation by modifying the activity or expression of proteins has been developed. These proteins, in their naturally occurring or expressed forms, can be used for drug development. These drugs would likely be useful for treatments ranging from cancer, prostatic hypertrophy, benign prostatic hypertrophy, hypertension, atherosclerosis and many other disorders involving abnormal cell growth or proliferation.

Application area

Target for drug development for diseases involving abnormal proliferation of cells, including psoriasis (hyperproliferation of skin cells) and benign prostatic hypertrophy.

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