Redox-Sensitive Transcription Factors in Cellular Defense Against Proinflammatory and Prooxidative Injuries

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There are multiple lines of compelling evidence supporting the association between inflammatory tissue damage and cancer. A new horizon in chemoprevention research is the recent discovery of molecular links between inflammation and cancer. Components of the cell signaling network, especially those converge on redox-sensitive transcription factors including nuclear factor-kappaB (NF-κB) involved in mediating inflammatory response, have been implicated in carcinogenesis. A wide variety of chemopreventive and chemoprotective agents can alter or correct undesired cellular functions caused by abnormal pro-inflammatory signal transmission mediated by NF-κB. Modulation of cellular signaling involved in chronic inflammatory response by anti-inflammatory agents hence provides a rational and pragmatic strategy in molecular target-based chemoprevention. Induction of phase-2 detoxifying or antioxidant enzymes represents an important cellular defence response to oxidative and electrophilic insults. Nrf2, another redox-sensitive transcription factor, plays a crucial role in regulating phase-2 detoxifying/antioxidant gene induction. Many chemopreventive and chemoprotective agents have been found to activate this particular transcription factor, thereby potentiating cellular antioxidant capacity.

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