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Cellular responses to DNA damage and oncogenesis by the p53 and pRb/E2F pathways

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Abstrak

Cellular responses to stress including DNA damage show multiple options involving the mechanisms of growth arrest, DNA repair and programmed cell death or apoptosis. Failures in these mechanisms can result in oncogenesis or accelerated senescence. Much of the response is coordinated by p53, a nuclear phosphoprotein with a central role in the defences against physical, chemical and pathogenic agents which challenge the DNA integrity. The p53 pathways for mobilising the cellular defences are linked to the pRb/E2F pathways regulating the cell cycle progression. This paper aims to review the current understanding on the networks and main molecular machinery of these processes. In addition, the implications on cellular decision making for the defences as well as evolutionary aspects of these mechanisms are discussed in brief.