Prof Dr. Aysam Mahmoud Fayed - Aysam.Mahmoud.Ali@uomus.edu.iq
M.Sc. Mazin Eidan Hadi - mazin.eidan@uomus.edu.iq

Examples of tumor suppressor genes

1- The *p53* Tumor Suppressor Gene:

The *p53* tumor suppressor gene plays a central role in cell cycle control, apoptosis, and maintenance of genetic stability. It encodes a 53-kDa nuclear phosphoprotein translated from a 2.8- kb mRNA. The gene spans about 20 kb on the short arm of human chromosome 17 (17p13). The p53 protein binds to specific DNA sequences and controls the expression of different regulator genes involved in growth. It interacts with other proteins in response to DNA damage and mediates apoptosis (cell death) of the cell when the damage is beyond repair. Its basic function is to control entry of the cell into the S phase . Somatic mutations in the *p53* gene occur in about half of all tumors. Mutations in the gene for p53 also cause tumors; in more than 90% of human cutaneous squamous cell carcinomas (skin cancers) and about 50% of all other human cancers, *p53* is defective. Those very rare individuals who *inherit* one defective copy of *p53* commonly have the Li-Fraumeni cancer syndrome, in which multiple cancers (of the breast, brain, bone, blood, lung, and skin) occur at high frequency and at an early age. The explanation for multiple tumors in this case is the same as that for *Rb* mutations: an individual born with one defective copy of *p53* in every somatic cell is likely to suffer a second *p53* mutation in more than one cell in his or her lifetime.

Prof Dr. Aysam Mahmoud Fayed - Aysam.Mahmoud.Ali@uomus.edu.iq
M.Sc. Mazin Eidan Hadi - mazin.eidan@uomus.edu.iq

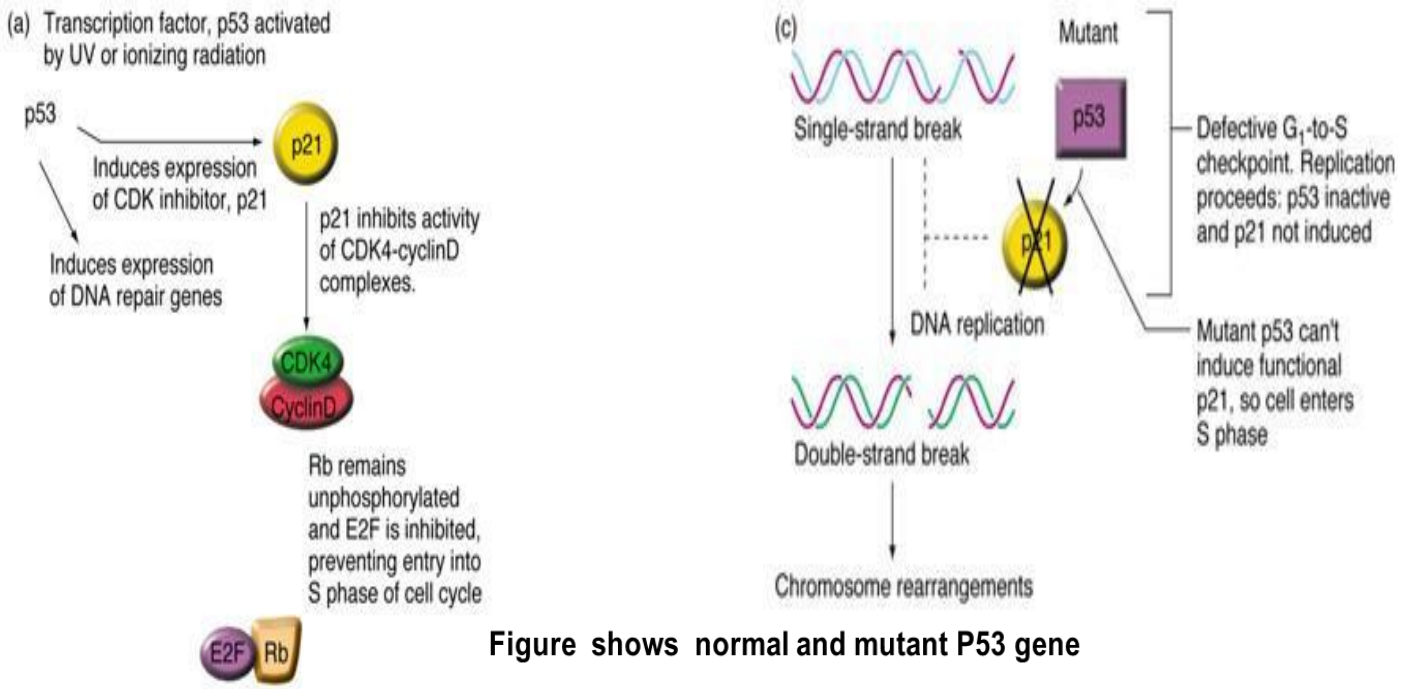
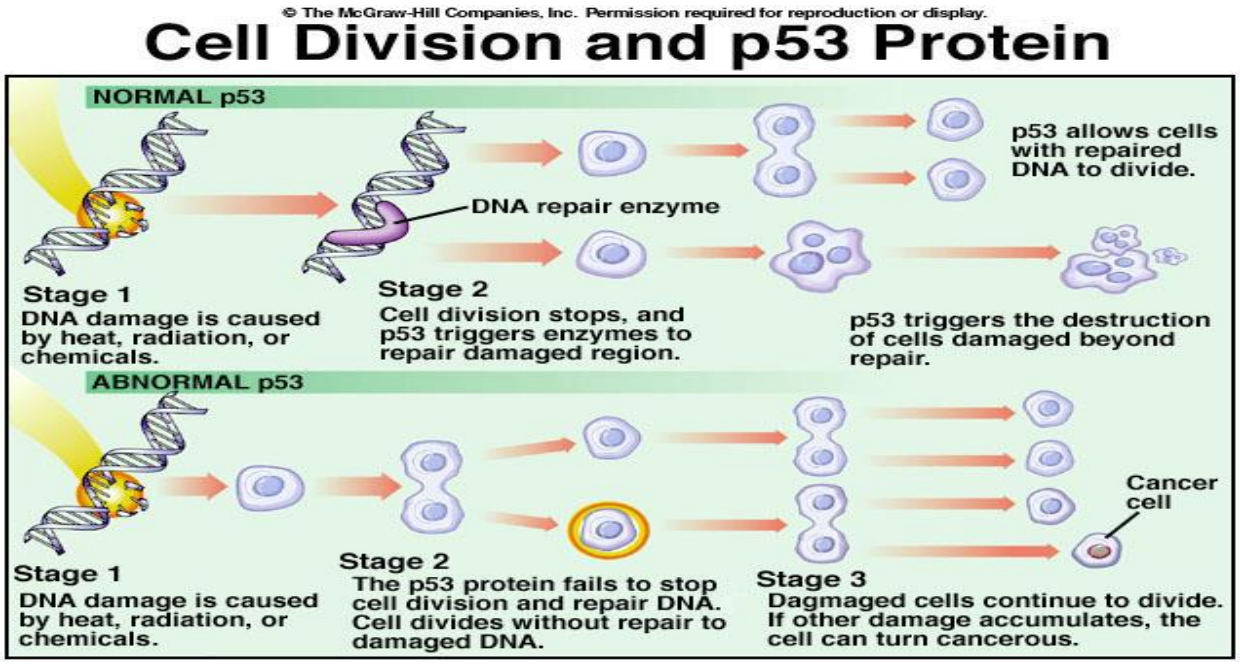


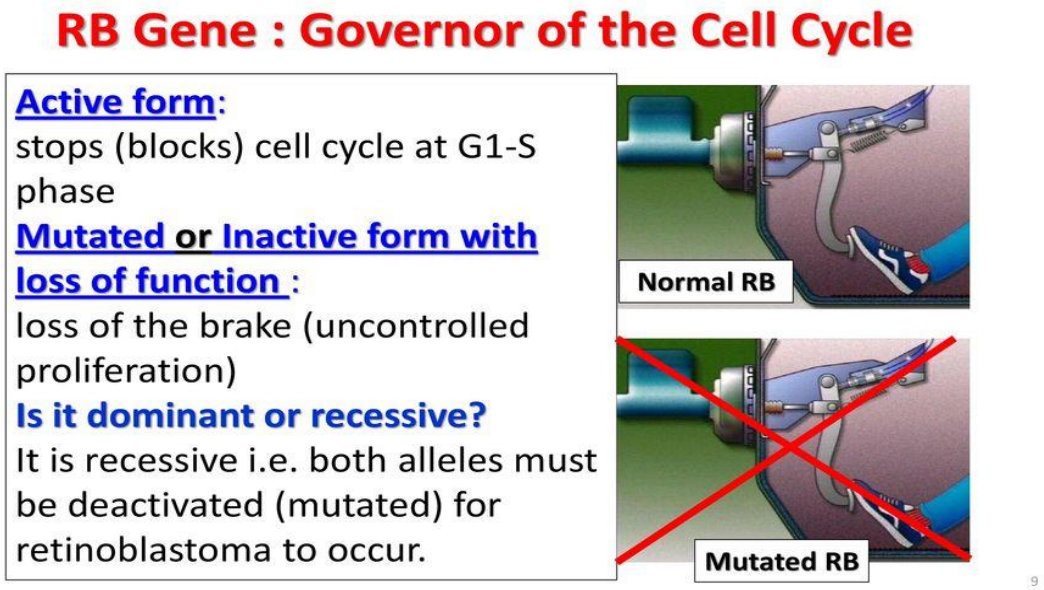
Figure shows normal and mutant P53 gene



Prof Dr. Aysam Mahmoud Fayed - Aysam.Mahmoud.Ali@uomus.edu.iq
M.Sc. Mazin Eidan Hadi - mazin.eidan@uomus.edu.iq

2- Rb gene

Rb 'Retinoblastoma gene' is a tumor suppressor gene. Rb gene is located on chromosome 13q14. Rb gene encodes a protein that inhibits E2F, a transcription factor that activates several genes involved in cell division. Mutation in Rb gene associated with certain forms of cancer.



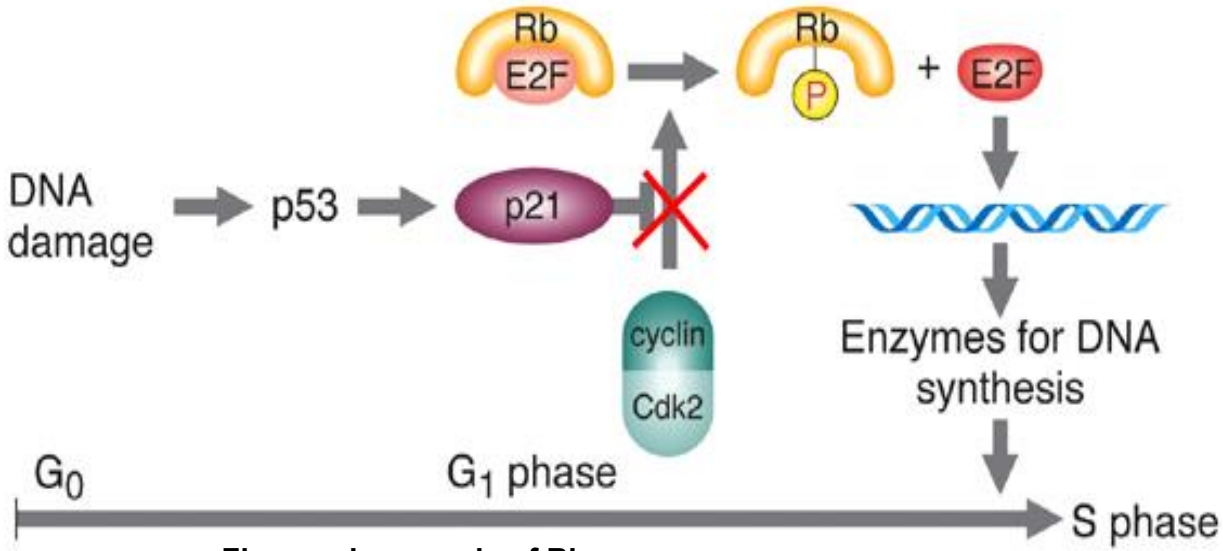


Figure shows role of Rb gene.