

## 7.013 Section problem: Oncogenes and Tumor Suppressors

For the following a-d, state whether the procedure could cause cells to lose growth control. Explain your reasoning.

a) A copy of the activated *ras* oncogene isolated from a tumor is introduced into a cell that carries two normal copies of the *ras* proto-oncogene.

b) A copy of the mutant *Rb* tumor suppressor gene is introduced into a cell carrying two normal copies of the *Rb* gene.

c) A copy of the gene for epidermal growth factor receptor (EGFR) that encodes a mutant, constitutively active receptor is introduced into a cell that carries two normal copies of the EGFR gene.

d) A normal erythropoietin (*epo*) cDNA (encodes a growth factor for erythroid stem cells) attached to a constitutive promoter is introduced into an erythroid stem cell that carries two normal copies of the erythropoietin gene.

e) Would introduction of a normal copy of the *Rb* gene into a retinoblast cell that was *Rb*<sup>+</sup>/*Rb*<sup>-</sup> alter the probability of the cell becoming a tumor cell? Explain.