Question 9. Based on Riccio et al 1999: **Mediation by a CREB family transcription factor of NGF-dependent survival of sympathetic neurons**

a (3 points). Refer to figure 2, below. Here, the authors show that CREB-mediated gene expression is sufficient for NGF mediated survival. Briefly describe the experimental strategy and how it demonstrated CREB was sufficient in promoting neuronal survival.

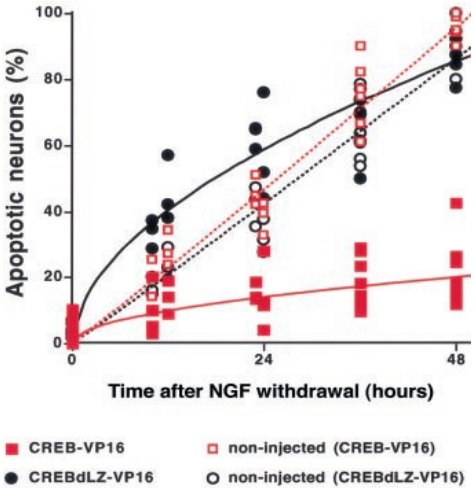

Figure 2.

b (2 points). In figure 3A below, what is the main "take-home" message from this experiment?

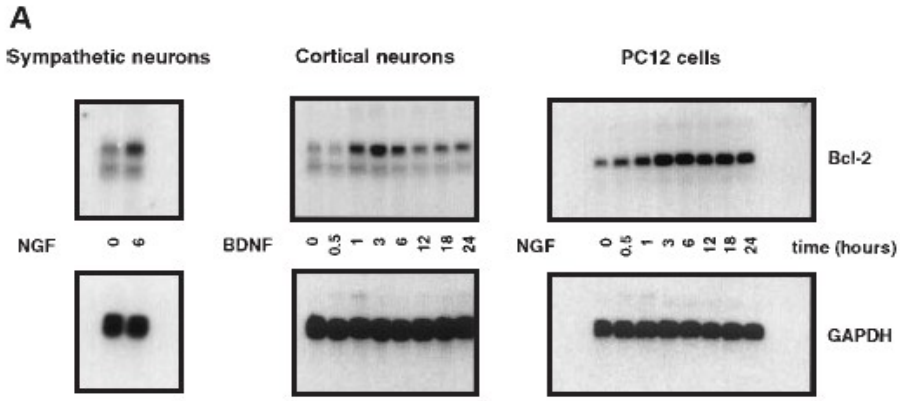

Figure 3A: expression of Bcl-2 mRNA after exposure of sympathetic neurons to NGF, PC12 cells to NGF, or cortical neurons to BDNF.

c (2 points). Refer to Figure 4C, below. In this experiment, the authors wanted to know whether CREB mediates NGF induction of Bcl-2 expression in neurons. They examined NGF-induced expression of a *bcl-2* reporter gene and looked at the levels of Bcl-2 promoter activity.

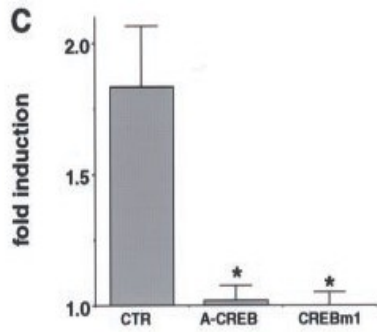

Figure 4C.
What region of the bcl-2 gene is fused to the luciferase reporter gene to compare levels of bcl-2 induction?

d (3 points). Refer to Figure 4F below. Here, the authors examined levels of CREB expression compared to levels of Bcl-2 expression in transgenic mice. What is represented by the +/-, -/-, and +/+ symbols marking each lane? Give a reason why there might be some Bcl-2 expression even in the absence of CREB. What would you expect to be the phenotype of a CREB knockout animal?

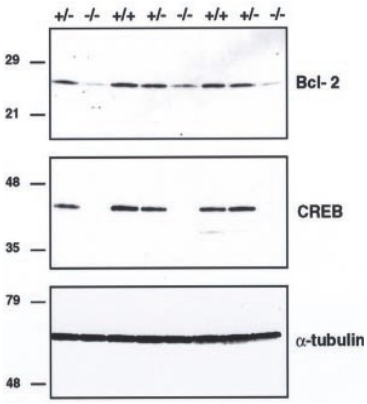

Figure 4F.