**Quiz 5B (20 points) -** Please enter **02** in “TEST/QUIZ NUMBER” on your bubble sheet

**The *C. elegans* vulva formation requires cell-cell signaling between anchor cell (AC) and vulva precursor cells (Pn.p). Based on our discussion in class, please answer the 6 questions below.**

**1) The *C. elegans* *let-23* gene encodes:**

1. A secreted growth factor.
2. A receptor tyrosine kinase.
3. A cytoplasmic serine threonine kinase.
4. A small GTPase.
5. A microRNA.

**2) Which of the following genes encodes a small GTPase?**

1. Lin-3.
2. Lin-12.
3. Lin-45.
4. Let-23.
5. Let-60.

**3) With respect to vulva formation, what is the phenotype of *lin-3-* animal?**

1. Multiple anchor cells.
2. One vulva structure (wild type).
3. Multiple vulva structures.
4. No vulva structure.

**4) What is the expected phenotype of a mosaic animal, in which the genotype of anchor cell is *lin-3+* and the genotype of Pn.p cells is *in-3-*?**

1. Multiple anchor cells.
2. One vulva structure (wild type).
3. Multiple vulva structures.
4. No vulva structure.

**5) What is the expected phenotype of a double mutant animal, in which the genotype of anchor cell and Pn.p cells is *let-60-*, *let-23gof* (a gain-of-function allele)?**

1. Multiple anchor cells.
2. One vulva structure (wild type).
3. Multiple vulva structures.
4. No vulva structure.

**6) Which of the following gene products usually mediates lateral inhibition?**

1. Let-23.
2. Let-60.
3. Lin-3.
4. Lin-12.
5. Lin-45.

**7) In snail coiling, dextral (D, right-handed twist) is dominant, whereas sinistral (d, left-handed twist) is recessive. Based on this, predict the progeny phenotypic ratio from a cross between dextral Dd males and sinistral dd females.**

1. ½ of the progeny will be dextral and ½ of the progeny will be sinistral.
2. ½ of the sons will be dextral, ½ of the sons will be sinistral, and all the daughters will be dextral.
3. ½ of the daughters will be dextral, ½ of the daughters will be sinistral, and all the sons will be dextral.
4. All progeny will be sinistral.
5. All progeny will be dextral.

**8) Which of the following statements most accurately describes the key event for the formation of dorsal/ventral axis during *Drosophila* embryogenesis?**

1. Localization of a specific maternal RNA at posterior pole.
2. Activation of receptor tyrosine kinase pathway.
3. Activation of Notch receptor.
4. Localization of a specific maternal RNA at anterior pole.
5. Nuclear translocation of a specific transcription factor.

**9) The localization of bicoid mRNA to the anterior pole is controlled by:**

1. A determinant in the 3’UTR.
2. The presence of 5’-mG cap.
3. A determinant in the 5’UTR.
4. A determinant in the coding sequence.
5. A determinant in one of the introns.

**10) You have isolated a *Drosophila* mutant defective in A-P (Anterior-Posterior) patterning. Examination of the mutant cuticle shows that a part of pattern in every other segment is deleted. Based on this, which of the following statements is likely correct?**

1. This mutation disrupts a segment-polarity gene, and the expression of this gene will show 14 stripes.
2. This mutation disrupts a gap gene, and the expression of this gene will show one broad stripe.
3. This mutation disrupts a homeotic gene, and the expression of this gene will show one broad stripe.
4. This mutation disrupts a pair-rule gene, and the expression of this gene will show 14 stripes.
5. This mutation disrupts a pair-rule gene, and the expression of this gene will show 7 stripes.