GMAT-Reading-Test 14

**Passage 14**

Nearly a century ago, biologists found that if they

separated an invertebrate animal embryo into two parts

at an early stage of its life, it would survive and develop

as two normal embryos. This led them to believe that the

**(5)** cells in the early embryo are undetermined in the sense

that each cell has the potential to develop in a variety of

different ways. Later biologists found that the situation

was not so simple. It matters in which plane the embryo

is cut. If it is cut in a plane different from the one used

**(10)** by the early investigators, it will not form two whole

embryos.

A debate arose over what exactly was happening.

Which embryo cells are determined, just when do they-

become irreversibly committed to their fates, and what

**(15)** are the “morphogenetic determinants” that tell a cell

what to become? But the debate could not be resolved

because no one was able to ask the crucial questions

in a form in which they could be pursued productively.

Recent discoveries in molecular biology, however, have

**(20)** opened up prospects for a resolution of the debate.

Now investigators think they know at least some of the

molecules that act as morphogenetic determinants in

early development. They have been able o show that,

in a sense, cell determination begins even before an egg

*(***25)** is fertilized.

Studying sea urchins, biologist Paul Gross found

that an unfertilized egg contains substances that func-

tion as morphogenetic determinants. They are located

in the cytoplasm of the egg cell; i.e., in that part of the

**(30)** cell’s protoplasm that lies outside of the nucleus. In the

unfertilized egg, the substances are inactive and are not

distributed homogeneously. When the egg is fertilized,

the substances become active and, presumably, govern

the behavior of the genes they interact with. Since the

**(35)** substances are unevenly distributed in the egg, when the

fertilized egg divides, the resulting cells are different

from the start and so can be qualitatively different in

their own gene activity.

The substances that Gross studied are maternal

**(40)** messenger RNA’s --products of certain of the maternal

genes. He and other biologists studying a wide variety

of organisms have found that these particular RNA’s

direct, in large part, the synthesis of histones, a class

of proteins that bind to DNA. Once synthesized, the

**(45)** histones move into the cell nucleus, where section of

DNA wrap around them to form a structure that resem-

bles beads, or knots, on a string. The beads are DNA

segments wrapped around the histones; the string is the

intervening DNA. And it is the structure of these beaded

**(50)**DNA strings that guides the fate of the cells in which

they are located.

1. The passage is most probably directed at which kind of

audience?

(A) State legislators deciding about funding levels for a

state-funded biological laboratory

(B) Scientists specializing in molecular genetics

(C) Readers of an alumni newsletter published by the

college that Paul Gross attended

(D) Marine biologists studying the processes that give

rise to new species

(E) Undergraduate biology majors in a molecular

biology course

2. It can be inferred from the passage that the

morphogenetic determinants present in the

early embryo are

(A) located in the nucleus of the embryo cells

(B) evenly distributed unless the embryo is not

developing normally

(C) inactive until the embryo cells become irreversibly

committed to their final function

(D) identical to those that were already present in the

unfertilized egg

(E) present in larger quantities than is necessary for the

development of a single individual

3. The main topic of the passage is

(A) the early development of embryos of lower marine

organisms

(B) the main contribution of modern embryology to

molecular biology

(C) the role of molecular biology in disproving older

theories of embryonic development

(D) cell determination as an issue in the study of

embryonic development

(E) scientific dogma as a factor in the recent debate over

the value of molecular biology

4. According to the passage, when biologists believed that

the cells in the early embryo were undetermined, they

made which of the following mistakes?

(A) They did not attempt to replicate the original

experiment of separating an embryo into two parts.

(B) They did not realize that there was a connection

between the issue of cell determination and the

outcome of the separation experiment.

(C) They assumed that the results of experiments on

embryos did not depend on the particular animal

species used for such experiments.

(D) They assumed that it was crucial to perform the

separation experiment at an early stage in the

embryo’s life.

(E) They assumed that different ways of separating an

embryo into two parts would be equivalent as far

as the fate of the two parts was concerned.

5. It can be inferred from the passage that the initial

production of histones after an egg is fertilized takes

place

(A) in the cytoplasm

(B) in the maternal genes

(C) throughout the protoplasm

(D) in the beaded portions of the DNA strings

(E) in certain sections of the cell nucleus

6. It can be inferred from the passage that which of the

following is dependent on the fertilization of an egg?

(A) Copying of maternal genes to produce maternal

messenger RNA’s

(B) Sythesis of proteins called histones

(C) Division of a cell into its nucleus and the cytoplasm

(D) Determination of the egg cell’s potential for division

(E) Generation of all of a cell’s morphogenetic

determinants

7. According to the passage, the morphogenetic

determinants present in the unfertilized egg cell are

which of the following?

(A) Proteins bound to the nucleus

(B) Histones

(C) Maternal messenger RNA’s

(D) Cytoplasm

(E) Nonbeaded intervening DNA

8. The passage suggests that which of the following plays a

role in determining whether an embryo separated into

two parts will two parts will develop as two normal

embryos?

Ⅰ.The stage in the embryo’s life at which the separation

occurs

Ⅱ. The instrument with which the separations is

accomplished

Ⅲ. The plane in which the cut is made that separates

the embryo

(A) Ⅰonly

(B) Ⅱ only

(C) Ⅰ and Ⅱ.only

(D) Ⅰ and Ⅲ.only

(E) Ⅰ,Ⅱ, and Ⅲ

9. Which of the following circumstances is most

comparable to the impasse biologists encountered in

trying to resolve the debate about cell determination

(lines 12-18)?

(A) The problems faced by a literary scholar who wishes

to use original source materials that are written in

an unfamiliar foreign language

(B) The situation of a mathematician who in preparing a

proof of a theorem for publication detects a

reasoning error in the proof

(C) The difficulties of a space engineer who has to

design equipment to function in an environment in

which it cannot first be tested

(D) The predicament of a linguist trying to develop a

theory of language acquisition when knowledge of

the structure of language itself is rudimentary at best

(E) The dilemma confronting a foundation when the

funds available to it are sufficient to support one of

two equally deserving scientific projects but not both

**ANSWERS**

E

E

D

E

A

B

C

D

D