URI CMB 190
Issues in Biotechnology

Lesson 17 Study Guide: Medical Biotech & Animal Cloning

18. Cloning illustrates that all of the genetic material required for an organism is in its DNA and that that information is in most cells of an adult organism. The control of biological feedback loops through modern biotechnology is of key interest to

(A) agricultural biotechnology only
(B) across the various applications in biotechnology
(C) pharmaceutical biotechnology only
(D) tissue or organ level in medical biotechnology for humans
(E) The field of gene therapy only

19. The control of gene expression is critical to all living things especially during the re-programming processes involved with cloning. . The amino acid tryptophan is important for making many proteins. When there is plenty of tryptophan in a cell a protein binds to the gene that codes for enzyme that will make tryptophan. When there is no tryptophan present this protein falls off the DNA allowing the gene to be expressed so more tryptophan can be made. A protein that binds to a site on DNA next to a gene and blocks the transcription of that gene, thus preventing the synthesis of a protein that the gene prescribes is known as a:

(A) gene
(B) initiator
(C) repressor
(D) receptor
(E) promoter

20. When a cell is cloned, the programs of gene expression are 're-set'. Having the capability to sense signals and react to stimuli is a central feature to all biological life processes. What are the regulatory processes in which there are signals indicating "too much" or "too little" which result in a correction to the processes?

(A) feedback loops
(B) regressions
(C) stop codons
(D) auto rewinds
(E) edit functions

21. Animal Cloning and genetic engineering has been demonstrated in a number of species, including, sheep, pigs, dogs, cats, mules, mice, rats and cattle. One can presume that these technologies in principle apply to humans. The main reason this has not been accomplished for humans is:

(A) there is no good medical reason to support such research
(B) there are already plenty of people, so there is no reason to make more
(C) research on human cloning has been banned in most developed countries
(D) The uniqueness and complicated nature of human biology prevents it
(E) humans have a soul which cannot be cloned

22. What is gene therapy?
(A) Replacing mutated gene with healthy copy
(B) Inactivating/knocking out a mutated gene
(C) All of these answers are correct
(D) Using genes to prevent or treat disease
(E) Using nucleic acids as new pharmaceutical drugs

23. The ability to control gene expression in a target cell is of key interest to gene therapy. Can we turn on insulin expression, for example, in pancreatic cells, as a treatment for diabetes? A protein that binds to a site on DNA next to a gene and blocks the transcription of that gene, thus preventing the synthesis of a protein that the gene prescribes is known as a: The segment of DNA which precedes (upstream) the coding region of a gene is called a:

(A) protaganist
(B) regurgitator
(C) responder
(D) receptor
(E) promoter

24. Gene Therapy offers a technology:

(A) to replace all of your genes and fix all abnormalities
(B) is a good idea from some funded research proposal to the National Institutes of health (NIH) for gene replacement that has never been reduced to practice
(C) may provide a method for replacement of mutant genes
(D) is not considered controversial since it has been so widely applied since the 1990s
(E) has now been approved for therapeutic treatments by the FDA for various diseases including hemophilia, SCID, and HIV/AIDS

25. Degenerative diseases that result in cell death or function, such as Parkinson's and Alzhiemer's, injuries that may result in damages cells and tissues, such as spinal cord injuries, and the lack of available human donor organs for transplant has motivated scientists to investigate new ways to replace the functions of diseased organs. Promising approaches to these problems that have received considerable research are

(A) xenotransplantation and tissue engineering
(B) all of these approaches
(C) gene therapy
(D) creation of artificial biomedical devices
(E) stem cells

26. Pigs have been genetically modified and cloned to produce donor pigs that have had the major proteins removed that are responsible for immuno-rejection. The drawbacks or obstacles for xenotransplantion are:

(A) making and cloning of transgenic animals
(B) transmission of animal viruses to human recipient and to general population
(C) it is too expensive to create each transgenic pig
(D) acute hyper-rejection of xenogeneic tissue
(E) all of these answers apply

27. The manipulation of cells *in vitro* (literally *'in glass"*- outside of the body in tissue or cell culture) in order to form replacement tissues/organs that can be transplanted into patient is called:

(A) tissue engineering
(B) cancer
(C) transgenics
(D) homeopathic medicine
(E) xenotransplantation

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29. Nanotechnology (sometimes shortened to "nanotech") is the manipulation of matter on an atomic and molecular scale. Generally, nanotechnology works with materials, devices, and other structures with at least one dimension sized from 1 to 100 nanometres. Some recently suggested application for nanotechnology to medical biotechnology include

(A) Cyber (computer) technology implanted devices
(B) Cellular nanotechnology
(C) Nano-sized oxygen carriers
(D) Implantable nano-devices allowing GPS
(E) All of these examples

30. Cloning of various animal species has been accomplished in many countries over the past several decades. The same procedures could be applied to humans. Human cloning is

(A) Banned world-wide for any purpose
(B) Allowed for research purposes only
(C) Funded by the US National Institutes of Health
(D) Driving new cures for genetic diseases
(E) All of these examples