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Simplifying Test Prep

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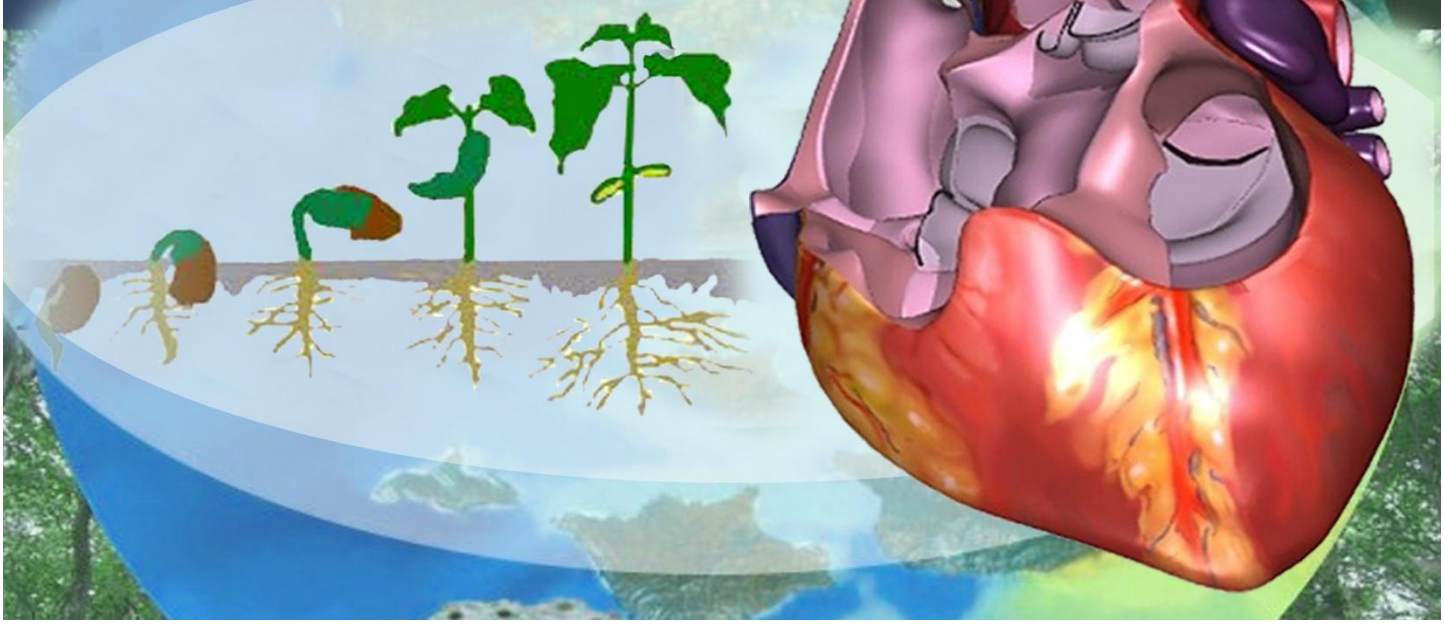
CBSE Class 12th Biology Solved Question Paper 2011-Set III



Preface

This e-book is prepared by the CBSE board exam experts of jagranjosh.com, an online educational portal of Dainik Jagran.

The purpose of providing solutions for CBSE class 12th Biology Question Papers 2011 is to explain the questions in an easy way and as per the CBSE marking scheme. This is a product exclusively for CBSE class 12th students which acts as a time-saver by providing a pattern for the solutions of previous year questions as per the CBSE curriculum. This document help to build a strong concept on the chapter mentioned in here and hence the students have been guided in the most appropriate way for their board examination

Solved Question Paper 2011
Biology
Class – XII
Set - III

1. List the changes the primary oocyte undergoes in the tertiary follicular stage in the human ovary.

Answer

Oogenesis leads to the formation of oogonium or egg. Cell division start and enters to prophase I ofmitotic division and gets arrested, called as primary oocyte. Primary oocyte are surrounded by granulosa cells called as primary follicle, these primary follicles gets surrounded by granulosa cells and theca so called secondary follicles.

2. Why are cattle and goats not seen browsing on Calotropis growing in the fields?

Answer

Browsing of cattle and goat on Calotropisis an unusual phenomenon as the grass is highly toxic and produces chemicals like cardiac glycosides, nicotine, caffeine, quinine, strychnine, opium, etc.which provides them protection against grazers.

3. Mention how is mutation theory of Hugo de Vries different from Darwin's theory of natural selection.

Answer

According to Hugo deVries– mutation arises by sudden changes which are random and directionless.

Darwin –mutation occur in sequential process with minor heritable changes in successive generation. These variations are minute and directional.

4. Why are some organisms called as eurythermals and some others as stenohaline ?

Answer

Eurythermals – these organism remain functional at a wide range temperatures.animal displaying the property are having specialized ectoderm.Example - Goldfish can function at temperature extendingin between 5 to 30ºC.

Stenohaline –animals belonging to this category can tolerate a wide range of salinity in water.
Example – fishes of sea.

5. Mention the type of allele that expresses itself only in homozygous state in an organism.

Answer

Homozygous organism with sickle cell anemia display similar allele i.e.Hb^S (Hb^SHb^S)

6. Malaria, typhoid, pneumonia and amoebiasis are some of the human infectious diseases. Which ones of these are transmitted through mechanical carriers ?

Answer

Amoebiasis is caused by protozoan parasite, transmitted by Houseflies, mechanical carriers.

7. Name any two techniques that serve the purpose of early diagnosis of some bacterial viral human diseases.

Answer

Early detection of bacterial or viral disease results in the cure or limitation of diseases. Two technique serves the purpose is-

1 PCR Polymerase Chain Reaction
2 ELISA Enzyme Linked Immuno-sorbent Assay

8. Name the phenomenon and the cell responsible for the development ofa new individual without fertilization as seen in honey bees.

Answer

Parthenogenesis.

9. In a dihybrid cross white eyed, yellow bodied female Drosophila crossed with red eyed, brown bodied male Drosophila produced in F2 generation 1.3 percent recombinants and 98.7 percent progeny with parental type combinations. This observation of Morgan deviated from Mendelian F2 phenotypic dihybrid ratio. Explain, giving reasons,Morgan's observations.

Answer

Morgan performed various dihybrid crosses in Drosophila to study sex-linked gene. In his conclusion to the experiment "the two genes did not segregate independently of each other" and so deviate from 9:3:3:1.

Morgan suggested that linked genes are located in X chromosome. If two genes involved in dihybrid cross were situated on the same chromosome, the ratio of

parental gene combinations is much higher than the non-parental type. He defined it as linkage and the rearrangement of genes as recombination.

10. How are recombinant vectors created? Why is only, one type of restriction endonuclease required for creating one recombinant vector?

Answer

Recombinant vector is created using recombinant DNA technology. Where segments of DNA is isolated and fragmented to obtain desired sequence. Obtained sequence is then inserted into a host microbe where it gets incorporated with the host genome, called as vector.

Only single type of restriction endonuclease (RE) is used for creation of recombinant vector because the cut made by one RE will give one type of sticky ends that can be easily ligated using DNA ligase.

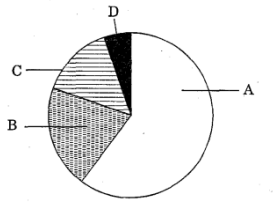
11. Bear hibernates whereas some species of zooplanktons enter diapauseto avoid stressful external conditions. How are these two ways differentfrom each other?

Answer

Hibernation – it is a process by which animal undergo hibernation for escaping time during winter.
Diapause – it is a process in which organism stays in suspended state.

12. The figure below shows the relative contribution of four greenhousegases to global warming:

1. Identify the gases A and C.
2. Why these four gases are called the greenhouse gases?



Answer

Given figure is a pi-chart describing various concentration of gases contributing to green house.

1. Labeling

A. Carbon dioxide (60%)
B. CFCs (14%)

2. The chart represents various concentration of carbon dioxide (A), Methane (B), CFCs (C) and N2O (D). These gases cause absorption and radiation of heat back to earth surface. Repetition of the process leads to formation of greenhouse effect.

13. At the time of Independence, the population of India was 350 million, which exploded to over 1 billion by May 2000. List any two reasons for this rise in population and any two steps taken by the Government to check this population explosion.

Answer

Rise in population-

1. Rapid increase in population is attributed to improve quality and facility of human being.
2. Other important factor contributing is sharp decline in death rate, maternal mortality rate & infant mortality rate, with sharp elevation of people in reproducible age.

Steps taken by government to check pollution explosion

1. Family planning, it was first initiated in the year 1951 and is evaluated every decay.
2. Reproductive and Child Health Care (RCH) programs.

14. Explain the function of 'reservoir' in a nutrient cycle. List the twotypes of nutrient cycles in nature.

OR

Explain with the help of two examples, how the pyramid of numbersand the pyramid of biomass can look inverted.

Answer

Nutrient is never lost from the ecosystem which is being recycled again and again so that they remain in the environment as a reservoir. Nutrient cycles are also called as biogeochemical cycle. There are two type of nutrient cycle

1. Gaseous
2. Sedimentary

OR

Pyramid of numbers-

It allow us to compare or study number of individual present in a particular tropical level at given time. During some special cases the pyramid may be inverted if-

a. Smaller animal feeds on large plant. e.g. butterfly larva fed by parasitic wasp.
b. Animals with huge numbers of parasites. E.g. Human body inhabits large number of parasites.

Pyramid of biomass-

Biomass is used to measure total number of living material present in a given place, comparing biomass at each tropical level. Pyramid may get inverted when-

a. Number of producer or presence of producer at a given time is lesser than biomass of consumers. E.g biomass of fishes is more than phytoplankton biomass.

15. A list of three flowering plants is given below. Which ones out of them are (i)monoecious and (ii) bearing pistillate flowers :
List — Date palm, Cucurbits and Pea.

Answer

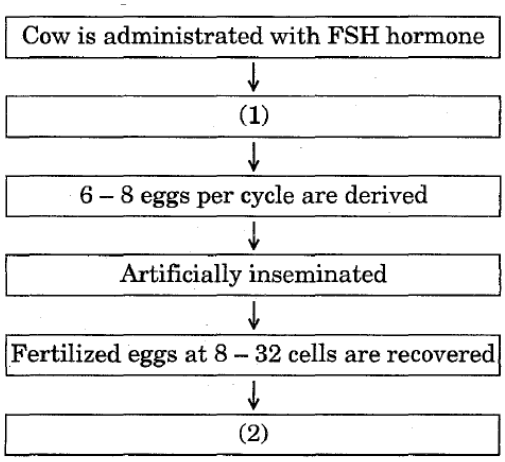
Monoecious plant- Cucurbits and Pea
Bearing pistillate flowers - Datepalm

16. Name the organism from where thethermostable DNA polymerase is isolated. State its role in genetic engineering.

Answer

DNA polymerase used in PCR technique is isolated from bacterium Thermusaquaticus. Use of DNA polymerase is attributed to its stability to resist and sustain at a very high temperature during renaturation of double stranded DNA.

17. Study the flow chart given below:



1. Identify the events that take place at stages (1) and (2)respectively.
2. State the importance of the technology explained above.

Answer

1. In the given flow chart we are discussing the technical steps involved during multiple ovulation embryo transfer technology (MOET).
Labeling
1. Induction of follicular maturation and super ovulation.
2. Recovered cell is transferred to surrogate mother.

2. Discussed method in the above section is multiple ovulation embryo transfer technology (MOET). This technique is applicable for:
1. Increase milk yielding capacity
2. Fertilizing female with high quality bull sperm.

18. Give the scientific name of the microbes from which cyclosporin A and statin are obtained. Write one medical use of each one of these drugs.

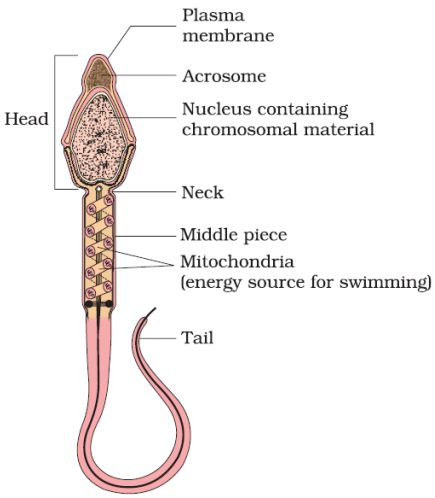
Answer

Cyclosporin A, it is used as immunosuppressive agent during organ transplantation. Cyclosporin A is extracted from a fungus named *Trichodermapolysporum*.

The strain produced from yeast is called as Monascuspurpureus, being used to deprecate blood cholesterol level. Which act as competitively inhibiting the enzyme responsible for synthesis of cholesterol.

19. Draw a labeled diagram of the microscopic structure of a human sperm.

Answer



20. Convergent evolution and divergent evolution are the two conceptsexplaining organic evolution. Explain each one with the help of an example.

Answers

Convergent evolution:

Evolution of unrelated organism in common environmental and ecological condition, e.g. Eyes of octopus and mammal or flips of penguin and dolphin.

Divergent evolution:

Development of homologous organs in organism specialized to perform different action are categorized as divergent evolution. E.g. development of humerus, radius, ulna, carpals, metacarpals and phalanges for different function.

21. (a) Name a drug used (i) as an effective sedative and pain killer (ii) for helping patients to cope with mental illnesses like depression, but often misused.
(b) How does the moderate and high dosage of cocaine affect the human body?

Answer

(a)

(i) Morphine is used as an effective sedative and painkiller.

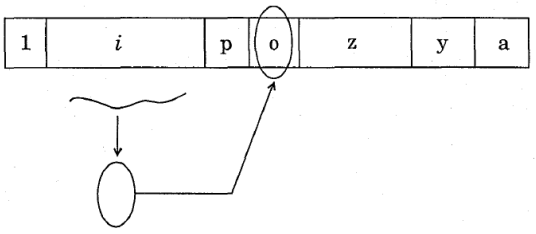
(ii) Morphine is often used in medical for patient to get relief from surgical pains, to cure depression etc. while administration of morphine in excess leads to hallucination or impairment of physiological function.

(b)

Cocaine- it is produced or isolated from plant named *Erythroxylum coca*, native of South America. It obstructs the functioning of neurotransmitter dopamine.
Mild dosage – stimulates the activity of CNS and transmit person in a state of euphoria.
High dosage – leads to hallucination.

22. Name the 'inducer' for this operon and explain its role.

A. Identify i and p
b. Name the inducer for this operon and explain its role.



Answer

From the figure

a. *i* denotes inducer, while p denote promoter
b. *i* act as an inducer, production of repressor by the inducer results in the blocking of operator gene from initiating transcription by RNA.

23. Explain the different steps involved in sewage treatment before it can be released into natural water bodies.

Answer

Water is believed to be the place where first life form has originated and we require it for the survival and maintenance of life on earth. Polluting water may lead to severe consequences for the survival of human and water animals. To check the level of pollutant in water government of India has established Water (Prevention and Control of Pollution) Act, 1974

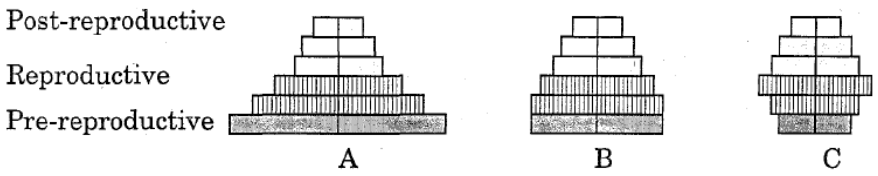
Most part of waste water is human excretions this municipal waste is called sewage. Sewage is added by many organic, inorganic and microbes (pathogenic). Discharge of these waters in natural system is done after treating them in STPs (sewage treatment plant).
STPs is done in two steps –

1. Primary treatment
2. Biological treatment

Primary treatment- removal of large and small colloidal particle is done by physical process, followed by its filtration and sedimentation. Supernatant of the treatment is send to biological treatment process.

Biological treatment – obtained effluent of primary treatment is kept in a large tank, agitated continuously with addition of air for the growth of aerobic microbes into flocks. Growing microbe consume organic matter with decrees in amount of BOD present. Treatment continues till BOD level reaches minimum level. Water is then allowed to sediment (active sludge) and floating water is released into water bodies for reuse.

24. Study the three different age pyramids for human population givenbelow and answer the questions that follow:
1) Write the names given to each of these age pyramids.
2) Mention the one which is ideal for human population and why.



Answer

1. Names of the given age pyramids
   A. Expanding
   B. Stable
   C. Decline

2. Pyramid B i.e. Stable condition of pyramid is best suited for human population because
   a. The ratio of male is to female is stable called as sex ratio.
   b. Number of reproductive population is followed by same number of pre-reproductive population.

25. Name a disorder, give the karyotype and write the symptoms a humansuffers from as a result of monosomy of the sex chromosome.

Answer

Klinefelter's Syndrome is characterized by the presence of and additional copy of X chromosome. With overall development of masculine character but have partial influence of feminine characters as development of breast.

Karyotype - 47, XXY

Monosomy of sex chromosome results in Down syndrome. Characteristic feature-

1. Individual will be short statured
2. Small round head, furrowed tongue and partially open mouth.
3. Broad palm
4. Mental retardation.

26. Explain, giving one example, how co-extinction is one of the causes ofloss of biodiversity. List the three other causes also (without description).

OR

Eutrophication is the natural aging of a lake. Explain.

Answer

Co-extinction – elimination of species, plant and animal showing obligatory way also become extinct. e.g elimination of fishes results in the elimination of its parasite from the environment.

Three other cause of biodiversity losses are -

1. Alien species invasions
2. Over-exploitation
3. Habitat loss and fragmentation

OR

Eutrophication is a process where lake attains biological enrichment in its water content.

Prior to eutrophication water in lake remain cold and clear with less number of microbes inhabiting. Addition of stream and small water body increases the nutritive (nitrogen and phosphorus) value of the lake encouraging growth of aquatic flora and fauna. The by-products of flora and fauna gets deposited on Lake Bottom and forms slit, lake grows shallower and warmer, with warm-water organisms supplanting those that thrive in a cold environment. Then marsh plant spread roots and form huge floating body finally leading to a land.

The whole process require thousands of year. It may get accelerated by human activity so called as Cultural or Accelerated Eutrophication

27. IARI has released several varieties of crop plants that are biofortified. Give three examples of such crops and their biofortifications.

Answer

IARI stands for Indian Agricultural Research Institute located in New Delhi have revealed various crops that are fortified with more nutrient, vitamin and amino acid content. E.g. carrot, spinach, pumpkin with high vitamin A, Vitamin C rich *bathua*, mustard, tomato etc.

Examples of bio-fortified crops –

1. Hybrid of maize with double concentration of amino acid lysine and tryptophane, as compared to native maize plant.
2. Atlas 66 is fortified with protein content used for improvement of cultivated wheat.
3. Development of rice with 5 folds increase in iron content.

28. a. Draw a diagram of an enlarged view of T.S. of one microsporangium of an angiosperm and label the following parts :

I. Tapetum
II. Middle layer
III. Endothecium
IV. Microspore mother cells

b. Mention the characteristic features and function of tapetum.

c. Explain the following giving reasons:

(i) Pollen grains are well preserved as fossils.

(ii) Pollen tablets are in use by people these days.

OR

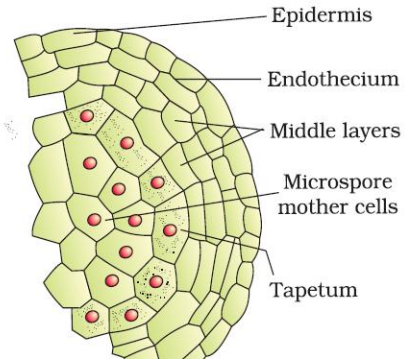
a. Why is the process of fertilisation in angiosperms termed as double fertilisation ? Explain.

b. Draw a diagram of an angiospermic embryo-sac where fertilisation is just completed. Label the following parts :

i. Micropylar end of the embryo-sac
ii. The part that develops into an embryo
iii. The part that develops into an endosperm
iv. The degenerating cells at the chalazal end
v. Draw a labelled diagram of globular embryonic stage of an angiosperm.

Answer

a.



b. Microsporangium in its transverse section displays four major structures as- epidermis, endodermis, middle layer and tapetum. Tapetum lies at the innermost side and nourishes developing pollen grains; these cells may have very tightly packed cytoplasm with more than one nucleus.

c.

i. Pollen grains are preserved as a fossil because of sporopollenin, they are resistant to high temperature, acid and alkali solution and even to all enzymes.

Sporopollenin is found in the exine part of pollen inside of which there is germ cell. Because of the mentioned property pollen are preserved as fossil inside Sporopollenin

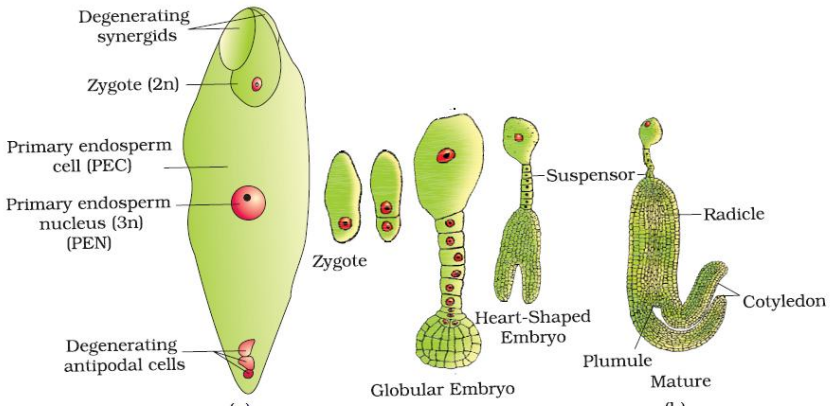
ii. Pollen grains are rich source of nutrient and are now used as tablet. In western country syrup and tablets are used by athlete and race horse to increase performance.

OR

a. Fertilization results in the formation of zygote. Fertilization in angiosperm takes place in two stages so termed as double fertilization.

Entry of synergids cell stimulate pollen tube for release of two male gametes. Of the two gamete one fuses with the nucleus of the egg cell completing syngamy, resulting in formation of diploid cell or the zygote. While other moves toward the polar nuclei located at the center and fuse together to form triploid primary endosperm nucleus (PEN) termed as triple fusion. Since occurrence of syngamy and triple fusion happens in a single cell the whole process is called as double fertilization.

b.



29. Name the process involved in the production of nematode-resistanttobacco plants, using genetic engineering. Explain the strategy adopted to develop such plants.

OR

Describe the various stages involved in gene transfer for the commercial production of human insulin by Eli Lilly.

Answer

Nematode resistance tobacco plants were produced with the help of RNAi called as RNA interference.

Nematods are found to inhabit various plant and animal species. One such nematode inhabiting tobacco plant is Meloidegyneincognitia, responsible for infecting roots of tobacco plant resulting in depleted production of tobacco.

Discovery of RNAi was a big solution to the issue. Where the process includes silencing of mRNA because of the presence of complementary dsRNA, prevent proceeding of mRNA translation called as silencing. Use of transposons is also recommended for the process to obtain complementary sequence.

Most widely used vector is *Agrobacterium.* Introduction of nematode specific gene results in production of both sense and anti-sense RNA in the host. Complementary nature of synthesised RNA forms dsRNA silencing specific mRNA of the nematodes. As a result of silencing the host couldn't sustain and results in death, protecting plant.

OR

Diabetes is taking tall elevation as the number of patient suffering from the disease increases day by day. So the demand of insulin for the treatment of diabetes is increasing.
It was found that animals also produce insulin but injection of animal derived insulin results in allergy to the patients. In intense research it was found that insulin can be produced from bacterium also. The advantage of bacterium source is that it can be cultured in large number in a short duration of time. Native insulin is called proinsuline or inactive insulin with 2 pollypeptide chain joined by disulphide bond. The proinsulin then undergoes enzyme activity and is converted into active insulin, which involves elimination of C peptide from proinsulin.

Eli Lilly in 1983 was the first American to prepare chain A and chain B of human insulin artificially. Which was then inserted inE. *coli* plasmid for production of chain A & B. The synthesised chain A and B was then separately isolated and was joined by disulphide bonds to create human insulin artificially.

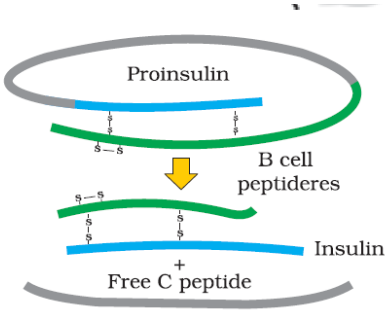


Figure synthesis of insulin.