Reborn of mammoth species biology essay

Science, Biology

Mr. Neil CairnieBiology 4UReborn of mammoth species. Mammoth is one of the species of the extincted genus Mammuthus. They lived 4000 years ago in Europe, Mexico, America and even Asia. Mammoths were members of elephantidae, thus they are also close relative to the recent elephants as both species share common ancestors. Mammoths extinct probably because of human's irresponsible activities such as hunting them for their bones and thusks that can be used to build houses and huts. Some mammoths can grow up to 4 metres and 12 tonnes of weight. However, most of the mammoths are just as big as the recent Asian elephants that is 2. 5 metres and exceed 5 tonnes by weight. Mammoths and elephants, both have thusks and trunks but the thusks of mammoth are longer and curvy compared to the elephants which have straight and shorter thusks. Their trunks are similar as both of them have two finger-like projections on their trunks yet elephants have longer ones. Mammoths have big bumps on their head and a sloping back. They even have same type and amount of teeth that is 6 set of teeth, each set consisting four and their chewing teeth are usually flat ones. These differences are due to their eating habits and living environment. For instance, mammoth's thick skin is covered with thick hair as it will aid them to survive cold climate. As for elephant they do not have much hair as they only live in warm environments not like mammoths which live in artic regions. Mammoths can be brought back from extinction by using three methods that are genetic engineering, cloning and also backbreeding. Backbreeding is a technique where scientists will practically choose a living species that is genetically similar to the extinct species and breed it until it obtains the traits of extinct species. Backbreeding is not a successful way to

bring back the extinct animals as it need a lot of time, maybe one generation would not be enough. In the talk, scientists used the genetic engineering method where DNA samples are obtained from the left over of the extinct animal such as hair, fat and bones. Then, they replace the specific gene sequence in their close relatives. For example, mammoth's cell must be obtained from it's decaying body parts. Then, it can be coaxed to produce millions of cells with similar characteristics. Those cells will be then reprogrammed so that embryos can be formed. The embryos will then be implanted in the surrogate mothers that shares common ancestors with mammoth that is the elephant. The third that is cloning is also not suitable for all the extinct species. Cloning is a process where genetically identical copies of cells, tissues or even an organism are created. Viable cell nuclei is obtained from the extinct species and is cloned by using a method that is the somatic nuclear transfer. For example, nucleus fom the mammoth will be transferred to the elephant egg cell where it's own nucleus is removed. Electric pulse is used to stimulate the fusion of the somatic cell and the egg cell without nucleus. The cells will then divid repeatedly forming mammoth embryo. The embryo will then be implanted to the surrogate mother that is the elephant's womb. The result will be a baby mammoth with some traits of mammoths and some of the elephants. If we observe carefully, in all three methods nucleus is the only organelle that serves a big role in bringing back the extinct species. This is because nucleus contain DNA that is the genetic material of an organism inherited from its parent. DNA stores information about its own replication and also the orders where the amino acid is linked to form protein. Before a cell undergoes mitosis, synthesis of DNA occurs.

This is where the DNA undergoes replication to form a duplicated chromosome that consist of two identical sister chromatids. DNA double helix is a molecules that contains deoxyribose sugar, phosphate groups and nitrogenous bases that are adenine, thymine, cytosine and guanine. Adenine only pair with thymine and cytosine only pair with guanine. The two strands are joined by the hydrogen bond between the nitrogenous bases. They are also antiparallel as one of the sequence is arranged from 5’ to 3’ while the other arranged from 3’ to 5’. DNA synthesis can be divided into two processes that is the continuous and discontinuous synthesis. Replication begins when helicase unwinds the double helix by breaking the hydrogen bond between nitrogenous bases. The single-strand binding protein will then hold the strands apart so that the bases will not bind with each other again. Now that the bases are exposed replication starts. Continuous synthesis of DNA produce leading strand. During this process, DNA polymerase reads the bases of gene strand from 3’ to 5’ direction. It will then forms complementary bases in the 5’ to 3’ direction to make new complementary DNA strand. On the other strand of the gene DNA, lagging strand is formed discontinuously. Primase will synthesis short RNA primer. It will then extended by DNA polymerase forming okazaki fragment. DNA ligase will then join the okazaki fragment to growing strand. After cell division, cell differentiation takes place. Cell differentiation is a process where less specialized cells become more specialized cell. This is the phase where red blood cells, white blood cells and other specialized cells are formed. Some of the cells are made up of protein. For instance, white blood cells. The DNA and RNA is the component that is responsible in the formation of protein in

an organism’s body. DNA first undergoes transcription process. It begins when RNA polymerase bind itself on the promoter region of the DNA sequence. DNA will then uncoil and seperates. The bases are now exposed. RNA synthesis will begin when RNA nucleotides align and added to the new RNA strand. The RNA polymerase will then move down the DNA causing the elongation of RNA to occur. Note that RNA polymerase can only read the gene from 3’ to 5’ direction. The mRNA will now leave the nucleus and move towards the cytoplasm. This does not require any energy because the concentration in nucleus is higher than the concentration of RNA in cytoplasm. Once it reaches to the ribosome, translation process will take place. This is where proteins are manufactured. This process begins when the ribosome moves ahead the mRNA until it finds a start codon. A codon consist 3 bases. tRNA that carries anticodons that matches the codon of the mRNA will drop of its amino acid. The ribosome will now move to other codon, releasing finished polypeptide, two empty tRNA and 2 subunits and the step repeats. A peptide bond is formed between the dropped amino acids. The ribosome will release the protein once it reaches the stop codon where no amino acid is coded to form peptide bond with the amino acid. The protein is now can be used in cell differentiation. I would strongly recommend that the species of mammoth should be brought back from the extinction. This is because de-extinction may help us to restore the damaged ecosystems and also offer insights for us about the natural resources that are currently unavailable. It also may play an important role in technology advancement where the technology of genetic engineering can be upgraded. http://media-2. web. britannica. com/eb-media/99/94699-034-B64D78EC. jpg