# Nucleotide excision repair

Nutrition

The Mrs.

. Translates the DNA coding so that it is readable by amino acids. The instructions then link the amino acids in the appropriate form so that they form the protein (National Institute of Health, 2014). DNA strands are constantly being damaged in the human body due to the body's ageing and not being able to repair itself as efficiently and many environmental conditions such as UP rays and radiation. These kinds of factors can results in a double break in a DNA strand. DNA damage is normal and usually not harmful to the body. The body has built in mechanisms which can normally repair damaged DNA so that it is not replicated and spread to there parts of the body.

Before a cell reproduces, it first checks the DNA to make sure that it is not damaged. If the DNA is damaged, the cell will attempt to repair the DNA (Negotiator, 2010). DNA can repair itself in many ways including Base Excision Repair, Nucleotide Excision Repair, and Double-strand Break Repair.

Base Excision Repair (BEER) is when a single nucleotide base pair is removed and replaced by the use of enzymes. Enzymes are proteins that are found in the body that are used to speed up chemical reactions. This type of repair is used mainly for DNA that is imaged from oxidation or hydrolysis and has only a single break. BEER leaves almost no damage to the double helix structure of DNA and can repair a single base. A similar type of repair is Nucleotide Excision Repair (NEAR).

This repairs DNA in the same way except that the DNA strand must be at least two bases long and can repair single strand breaks. There are about

twenty proteins involved in NEAR that have different purposes in repairing the DNA (Biomass, 2007). When there is a double strand break in DNA, the repair process is more difficult because sequences can be completely removed from the strands. The repair process is different from a single stranded break and there are two main ways to repair a double strand break: Monologues End Joining (NICE) or Homologous Recombination (HRS). NICE repairs the DNA during the cell cycle when the cell is replicating, but before the DNA is replicated.

NICE basically uses a protein that makes the broken part of the DNA strand able to bond again. Then, enzymes rejoin the DNA without a template. This means that the DNA could be joined to random other DNA segments which is highly unreliable and incorrect. HRS occurs during the cell cycle as well but at a efferent point. HRS occurs after the cells DNA template has been produced but it requires a specific DNA segment to be available to replace the damaged part of the DNA (Foibles, 2007).

If the DNA repair is unsuccessful, then the cell will perform apotheosis, become senescent, or become malignant. Apotheosis is when a cell is programmed to kill itself in order to protect the rest of the body. When a cell is senescent, it does not function at all and remains alive, but inactive, in the body. If a cell is malignant, it will reproduce uncontrollably and cause damage to the body (Foibles, 2007). If the DNA duplicates incorrectly, it can cause cancer and other types of diseases that are very harmful to the body. Many types of hereditary diseases are caused by breaks and mutations in DNA strands, so understanding how to repair DNA properly is important in preventing many types of illness and slow aging (Negotiator, 2010). The

process of aging results from metabolic processes and the intrinsic accumulation of toxic byproducts that build up in the body which cause damage to DNA. This causes age-related pathology and further deterioration Of the organism.

Bacteriologists have explored methods Of delaying nascence and have more recently proposed medical premeditation to repair the damage that ultimately results in age-related damage that is done to the body. Medical premeditation is modeled after environmental premeditation which is used to clean chemicals out of the environment by using plants and microorganisms. Medical premeditation uses the same concept to clean harmful chemicals and waste out of the body. Such an approach would avoid the ethical pitfalls of cloning and other gene related therapy, and would prevent the onset of senescence and the age-related diseases and pathologies it is accompanied by (“ Update on Medical Premeditation in the Latest Rejuvenation Research,” 2010). Enzyme therapy as a means of premeditation is an exciting option that shows promise as a viable treatment in the near future.

Enzymes are capable of speeding of chemical reactions which may be able to get rid of waste that has built up in the body that the body can no longer break down. This is a new field of research, so there is ongoing research regarding which types of enzymes to use and how to use them as catalysts. Enzymes are currently being used in medicines such as chemotherapy medicines which treat cancer patients. There are some who believe the enzyme therapy can improve a healthy persons’ body as well by strengthening the immune system and other functions of the body.

Actual application of such therapies is dependent on isolating the correct enzymes to remedial specific issues such as atherosclerosis. While additional research is necessary to achieve this goal, the biotechnologist needed to isolate and deliver the required enzymes are already available (American Cancer Society, 2008). Another option to slow aging and DNA damage is simply to reduce the caloric intake. A study was done on monkeys which showed that aging and disease ere greatly reduced when their caloric intake was cut by 30% for 25 years. The study consisted of 76 monkeys that were aged 7-14 years old.

Another group of monkeys ate as much as they wanted and showed a death rate that was three times that of the monkeys on the controlled diet. Unfortunately, most people are not able to cut their caloric intake by 30% and the reason for the slower aging and lower disease rate has not yet been proven. It could be that the body was able to break down the food easier and more effectively because it was not overloaded.

Preventive measures are the prudent choice for a long and healthy life. Reducing our caloric intake is not a realistic option as is evident from the obesity epidemic throughout much of the developed world (Attenuate, 2014). Moodiness, a medieval Jewish sage and physician, prescribes a lifestyle that is focused on balanced nutrition and the understanding that our greatest Weapon against senescence is a body free Of decaying agents. TO keep our bodies purified, it is not only necessary to eat, sleep, and exercise, but to do each at the appropriate times and in the correct amounts. This maximizes the absorption of nutrients and the efficiency of our metabolic processes.