Applied Evolution: Human Health And Medicine

Applied is “put to practical use as opposed to being theoretical (Merriam-Webster, n.d.).” Evolution is ‘the changing of an organism over generations.” If you put these two words together the definition of applied evolution is the practical use of the changing of an organism over generations. Specifically, in this essay you will read how applied evolution has impacted human health and medicine. This is called Darwinian medicine.

Darwinian medicine is named after Charles Darwin, who was a naturalist known for his theory of evolution by natural selection. It is a field of study that applies the principles of evolutionary biology to problems in medicine and human health. Evolutionary applications can range from population genetics to understanding why humans have certain traits. Evolutionary explanations can be based on the phylogeny of the trait. There are five different kinds of traits acted on by evolution. They are human traits, human genes, pathogen traits, pathogen genes, and cell lines (Neese, n.d.).

The evolutionary history of the human species does not cause disease and disorders but influences the likelihood of getting a disease in an environment. For example, adult humans had no reason to digest lactose prior to dairy becoming popular in the Middle East around 9,000 years ago. The lactase gene is expressed in infants, but not after that because there was no advantage in keeping it expressed. A mutation in the promoter lactase gene allows for the digestion of lactose. This mutation spread fast throughout the European population due to the advantage of having of it. Today, African and European descent have the mutation to digest lactose while Asian and Australian Aborigines do not have the mutation. 70% of the world is lactose intolerant. They could have traced this gene mutation through a phylogeny (Gluckman, 2011).

Humans today live much differently than humans did thousands of years ago. We lived in different environments with small social group, had different diets, and encountered less pathogens. The intense change along with an increase in population could have led to many more diseases. Evolutionary aspects are applied every day in the world of medicine. For example, coughing, diarrhea, and mucus secretion may be evolved mechanisms for getting rid of microbes. It may seem dumb to leave these symptoms untreated but blocking them could lead to longer or more serious illness (Gluckman, 2011).

Evolutionary biologists and doctors are needed to come together to better understand diseases and why and how they originated. The problem with medicine today is that they are focusing on how a disease is affecting a person and not how the disease even got there. They focus on the “what” and “how” and not the “why.” The focus needs to be on both aspects. Doctors also need to understand how the body came to be, instead of just looking at it as a machine (Dybas, 2017).

Antibiotic resistance is an example of natural selection through random mutation. Only the leftover strong bacteria survive and mutate. This is a severe problem facing the medical world that can be explained through evolution. Narrow spectrum antibiotics can decrease the risk of antibiotic resistance. The speed of infectious diseases evolving is leaving humans more

vulnerable to the disease (Antibiotic Resistance, n.d.).

Evolution has not been perfect with developing some parts of the human body. For example, the human eye has a blind spot where there are no photoreceptors (rods or cones) in the optic disk. On the other hand, the octopus eye has no blind spot. DNA replication errors are also a limitation to the human body. Darwinian medicine focuses on how nothing in the body can be perfect; things must have a tradeoff (Neese, n.d.).

Applied evolution can also explain the death of ten people in the Four Corners area of the southwest of America in the spring of 1993. Phylogenetic analysis discovered that the people had died from a new viral strain related to the Hantaviruses of the Old World. The host of the virus was deer mice and humans caught the disease by breathing in feces and urine. Phylogenetic analysis has also identified an antivenin for a snake bite. It showed that the Bardick snake is closely related to the death adder. The death adder antivenin works for bites from Bardick snakes (Cracraft, n.d.).

Evolution is about changing and adapting to the environment. The human genome is a good example to look at what genes have evolved successfully. The human genome project was completed in 2003, but what is now being studied is noncoding DNA. Noncoding DNA makes up about 98.5% of the total DNA and can control the expression of genes that deal with chromosome replication (Litwack, 2018). A study was done comparing regions of the genome of vertebrates and humans. A target area was human chromosome seven, which contains the gene that when mutated cause cystic fibrosis (Dybas, 2017).

Emerging infectious diseases that are viruses are caused by RNA viruses. This means that they evolve fast and their evolution and mutation rates are high in humans and mammals. A good trait of infectious diseases is being able to go from animals to human and then have human to human spread of the disease. AIDS is a disease that can do this. In West Africa, the logging industry exposed humans to primates that carry the viral relative to HIV. Therefore, HIV went from primates to humans and from there spread to other humans. After this disease kept spreading the concept came about that the closer in evolutionary time between the donor and recipient of the disease, the more likely the virus will spread (Dybas, 2017).

In conclusion, evolution still widely impacts today’s medicine from the evolution of diseases to understanding why humans have certain body parts. Doctors should refer to it more to really understand their patients. If doctors did not look back at evolution, they would have no idea how a virus came about or why it is now in humans. Diseases are constantly changing, so it is important to study these changes to better make the vaccines and control the spread of the disease. Human medicine is always evolving so applying evolution is needed.?