

Why Do Human Body Systems Go Into Catastrophic System Failure Leading to Diseases -Is the Answer in Science or Nature?

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Abstract

Both the human body and the natural world are governed by multiple complex systems. These systems have feedback loops which is a process in which the outputs of a system are circled back and used as inputs.

Where there are multiple systems, there is always the potential for a catastrophic system failure.

If a system fails in the human body, this can lead to a number of life-threatening and debilitating diseases such as cancer. Diseases such as cancer is in effect, the result of a catastrophic system failure. There are cancer cases in which the root cause of the disease is unknown.

System failure in the human reproductive system can lead to congenital birth defects.

In cases of a system failure leading to congenital birth defects, some of the causal factors are known but in 65% of these cases, the reasons for this reproductive system failure are unexplained.

There are neurological diseases such as Parkinson's, multiple sclerosis and Alzheimer's where again, the root causes are unknown.

Then there are a number of infectious diseases where the root cause is unknown. The initial causative factors for most of these human diseases are well known. What has yet to be fully understood is the primary root cause that triggers and underpins these system failures in the first place.

Nature also has devastating system failures such as in earthquakes and hurricanes.

Humans and nature are a close partnership and nature can influence human health. Nature's systems are deeply interconnected and often exhibit complex behaviours due to positive and negative feedback loops present in both nature and human body systems.

Using systems methodology and systems thinking and philosophical insights, the objective is to try to ascertain the answer as to why there are these unknown root causes of diseases; questions that presently, science alone cannot explain.

It will be argued that as man and nature are as one, the answers as to why human body systems fail leading to disease may lie not in science but in nature.

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Introduction

In order to investigate why things go wrong in the human body, it can be more helpful to think of the human body as a series of systems such as systems for digestion, reproduction and so on. The question is how a body system goes from a normal (*i.e.* natural) to a pathological or altered state. Although the nature of these body systems are complex, systems thinking is designed to provide a method which gives a deeper understanding of how to solve complex problems which lead to insights and understandings that are not usually provided by more conventional analytic approaches. [1]

The key issue is that with complex systems, there is a potential for catastrophic failure which is always present due to the nature of the system.

Although much is known about what causes serious diseases, in a number of cases there still remains unknown factors regarding the root causes.

Other than the known physiological explanations as to the causal factors in human diseases, in many cases, science has failed to discover the root cause possibly because most diseases have multiple interacting causes and the relative contribution of each cause is often unclear.

An estimated 6% of the world's population has had cancer. Cancer has been in existence on Earth even before humans first appeared as evidenced by paleontological findings of tumors in animals. The first description of human cancer has been found in the Edwin Smith Papyrus dated 3000 BC which was a case of breast cancer. [2]

It is possible that environmental and carcinogens which are modern day causes of cancer would not have had an influence in those ancient times leading to the question as to what was the causative factor in those days?

Some have argued that getting cancer is just due to bad luck. [3] The same could be said for all human diseases.

Cancer can often be devastating to sufferers and their families. The same applies to congenital birth defects and neurological diseases. Despite extensive ongoing research, aspects of cancer remain an incomplete and unresolved problem. System failure in the circulatory system such as arterial blockages are caused by the build up of plaque over time which gradually reduces heart function. Other than known causes such as smoking, high blood pressure and high levels of cholesterol, the cause of this build up of plaque in the arteries remain unknown.

Taking a reductionist approach may not be helpful as biological systems cannot be understood by this method due to the properties of the individual component parts which can only be understood in the context of the wider whole.[4]

It has also been advised that reductionism should be considered as unsuitable and more holistic and integrated systems approaches should be adopted. [5]

It has been suggested that many of the most common infectious diseases such as influenza the common cold and whooping cough have their origins in outer space. It was argued that comets from outer space could be the main source of these pathogens or at least their causative agents. [6]. However, this theory was roundly rejected by the scientific community.

It is abundantly clear that some diseases continue to defy a scientific explanation.

These unknowns that science cannot answer, implies that there may be an alternative non scientific account.

Body System Feedback Loops

Human body systems are often regulated by positive and negative feedback loops which respond to change; positive feedback amplifies change while negative feedback reduces harmful change. Feedback loops have outputs of the system which loop back as inputs, creating a cycle of cause and effect that can either amplify or stabilize changes within the system. An example of a positive feedback loop is the system for giving birth. When the process of birth begins, the head of the baby is pushed downwards which results in increased pressure on the cervix. This stimulates receptor cells to send a chemical signal to the brain, allowing the release of oxytocin. This oxytocin diffuses to the cervix via the blood, where it stimulates further contractions. These contractions stimulate further oxytocin release until the baby is born.

Negative feedback loops are self-correcting and bring a system closer to a target of equilibrium such as adjusting body temperature and controlling blood glucose.

The body also has open loop systems which do not have a feedback loop. For example in the fight or flight scenario, the brain reacts to danger by sending a signal which releases adrenaline into the body system. This process circumvents the monitoring delay action of a feedback loop as a quicker response is needed in this example.

Nature has open loop systems such as in volcanic eruptions. When magma reaches the surface, following eruptions happen; there are no feedback loops to regulate this process.

Disease could be considered to be an open loop system. The start of the disease enters the host, the disease is established and the output progresses to cause illness.

Feedback loop reasoning is a crucial element of systems thinking which includes the analysis and description of a systems actions and control measures. [7]

When Human Body Systems Fail

Cancer is the classic example of a system failure. According to the World Health Organization, cancer is the second leading cause of death globally, accounting for an estimated 9.6 million deaths,

Cancer starts when the process known as apoptosis fails. Apoptosis is system which is programmed to activate cell death in which cells destroy themselves and allow the smooth functioning of the body. When the apoptosis system fails, the cells do not die and begin to uncontrollably proliferate which leads to tumor development.

For this failure to occur suggests that for some reason, the negative feedback loop whose function is to prevent these events is incapable of halting this process. It is unlikely that the loop is simply missing. It could be possible that the positive feedback loop which in this case is amplifying the system's behaviour thus increasing the progress of this fault and by doing so, completely overwhelms and thus eliminates the actions of the negative feedback loop.

There is a suggestion that as a treatment for cancer, there may be the possibility of restoring the equilibrium maintained by the negative feedback loop via the stimulation of an area of the brain known as the hypothalamus. [8]

Environmental influences, chemicals and other substances and personal habits have long been believed to be the cause of cancer. There is a long list of carcinogens and biological and biochemical associations with human cancers that are related to the occupation of a person eg cadmium which can lead to prostate cancer in people working with painting and coating. [9]. Personal habits such as

smoking have been recognized as the leading cause of lung cancer in 90% of men [10] However, not all smokers get cancer. It is suggested that this is because they have very proficient systems for repairing DNA damage or detoxifying cigarette smoke,[11]

Then there are environmental issues such as radiation. Radiation is permanently present throughout the environment - in the air, water, food, soil and in all living organisms. In fact, a large proportion of the average annual radiation dose received by people is due to natural environmental sources. The risk of cancer mortality from high radiation exposure increases significantly and affects most major organs. [12]

Cancer is a complex disease and there are still many cases such as prostate cancer which is the most common cancer in men where the exact cause of this and other cancers remains unknown.[13]

There are cases of cancer in pet animals such as dogs and cats. Cancer burden seems at least as high in pets as in humans. [14]

Congenital Birth Defects

A high percentage of birth defects have no known or identifiable cause [15]

The main known causes of birth defects are smoking, drinking alcohol, or taking certain drugs during pregnancy. Having certain medical conditions, such as being obese or having uncontrolled diabetes before and during pregnancy. Taking certain medications, such as isotretinoin and lithium [16] Having someone in your family with a birth defect. Other causes can be chromosomal abnormalities such as being born with Down syndrome and single-gene defects which can lead to being born with spina bifida. With a significant percentage of cases of birth defects studied that cannot be attributed to an identifiable root cause. the conclusion is that science has yet to arrive at a complete understanding of why things can go wrong in this particular aspect of the reproductive system. Congenital birth defects also occur in animals.[17]

Neurological Diseases

The brain is the most complex organ of the human body and contains a multitude of complex systems and as such, the chances of a system failure occurring can be far greater than other organs of the human body. This is why neurological diseases are now the leading causes of health problems around the world.

There are well over a hundred different neurological diseases in humans. These diseases are usually a result of abnormal brain activity. However, a neurological problem can start in another body system that interacts with the nervous system. For example, cerebrovascular disease is caused by problems with the blood vessels (cardiovascular system) that supply the brain. [18]

In many cases, the root cause of these neurological diseases remains unknown. [19] Feedback loops feature in neurology for example when a neuron receives a signal, processes it, and then sends a response either to other neurons or back to the original source.

Some of the most common diseases are Parkinson's, strokes and Alzheimer's. Alzheimer's disease is often thought of as a condition that affects only the elderly. But around 3.9 million people worldwide aged 30-64 live with young-onset Alzheimer's disease – a form of dementia in which symptoms appear before the age of 65. [20] Parkinson's disease, also attributed to old age can also be found in people under 40 years of age [21] In many cases, the root causes of these human diseases are mostly unknown.

Neurological diseases are not limited to humans. In nature, animals can also exhibit a number of these types of disease. [22]

Some mental health diseases in humans are also shared with animals. Some animals do suffer forms of psychosis which has been observed in domestic pets, smaller animals and even in elephants. [23] However, it has been suggested that there is no evidence of animals suffering from schizophrenia. In humans, Schizophrenia in humans may be the unfortunate cost of our big brains, of higher complex cognition. [24] Most humans with schizophrenia are not violent. However, some living with schizophrenia can become violent and in some cases, commit murder while they are unwell.

There have been a number of cases in which dangerous dog breeds have killed babies. Babies are obviously no threat to the dog so it could be argued that these animals are showing symptoms of schizophrenia or at least some form of psychosis.

As with humans, most of the causes of neurological disease in animals remain unknown.

It would seem that again, science to date has only an incomplete understanding of why humans and animals develop these neurological diseases.

Infectious Diseases

Infectious diseases are one of the main sources of mortality in the world. These diseases are caused by pathogens which causes disease to its host. All living things are affected by pathogens which include bacteria, viruses and parasites. The origins of pathogens largely remain unknown. [25]

It is well established that infectious diseases are caused by pathogenic microorganisms such as bacteria, viruses, parasites or fungi that are present in animals and plants. In humans, serious bacterial infections such as sepsis and tuberculosis can be life threatening. Bacteria's origins are from nature and are found worldwide. It has been noted that bacteria are also intelligent as they are capable of adopting survival strategies. [26] There is emerging evidence that some of these 'intelligent' bacteria are surviving by becoming resistant to antibiotic treatment causing considerable medical problems.

Humans suffer from infectious diseases similar to the diseases of other wild primate populations. The human body has an immune system that protects against disease through complex mechanisms that involve recognition and elimination of pathogens. Positive feedback loops initiate the immune activation.

All animals possess a primitive system of defense against the pathogens to which they are susceptible.

Zoonotic diseases are infectious diseases of animals that can cause disease when transmitted to humans. Microorganisms are distributed throughout nature and on both human and animal bodies.

Several infectious diseases such as rubella, syphilis, tetanus and typhoid come from still unknown sources. These unknowns illustrate big gaps in our understanding of the origins of infectious diseases. [27]

As pathogens are ubiquitous in nature, perhaps this fact could be extrapolated to the idea that nature as a whole could be responsible for the root causes of all human and animal diseases. As oceans were nature's first form on earth, it is possible that ocean systems were the first carriers of infectious diseases. It has been discovered that a teaspoon of ocean water contain over 50 million viruses.[28]

Can Nature Explain Why There are Human Body System Failures-Are Humans Separate from Nature?

A simple definition of nature is that all the animals, plants, rocks, etc. in the world and all the forces such as hurricanes earthquakes, the seas the weather are features that happen or exist independently of

people.

Nature operates through a vast array of interconnected and complex systems. Similar to human body systems, nature's systems also have system failures and as with humans, the associated feedback loops and processes.

For example, a nature's system failure can result the destructive elements of nature such as hurricanes and earthquakes and floods. Negative feedback loops are vital in climate systems. Without the maintenance of equilibrium by the negative feedback loop, a positive loop can spiral out of control, leading to creating changes in the climate system that cannot be reversed for example in the formation of a hurricane.

Hurricanes undergo what is known as a "convective burst." This is where the positive feedback loop is activated. In passing over a large pool of warm water, the formation of the hurricane grows more intense by drawing in more moist air which leads to the formation of a hurricane. As is the case with cancer, the climate negative feedback loop is overwhelmed.

There is now increasing evidence that climate change is having an impact on aspects of nature. More than half of known human pathogenic diseases can be aggravated by climate change. [29]

There is the question as to whether humans are considered as wholly part of nature or not.

Descartes saw humans as wholly separate from and superior to nature and nonhuman animals, who were considered mere mindless machines to be mastered and exploited at will. However, this assertion has been challenged.

A study was conducted in order to discover whether people considered themselves synonymous with or separate from nature. 198 participants took part. 77% of the participants responded that they felt that they belonged to nature. [30] It has been argued that humanity is not a separate entity from nature, but it is only an intellectual disconnect makes us feel that we are. [31]

Although distinctions between the natural and the artificial can be blurred sometimes (e.g., human-made ponds) it remains that humans are living things and are thus part of nature due to their common evolutionary ancestry with other nonhuman living things.[32]

There are philosophical questions about the differences between humans and animals.

Several philosophers such as Aristotle and Kant have argued that rationality sets humans apart from other animals. However, this view has been challenged by asking if humans are the only rational animal. Many animals have demonstrated impressive capacities for causal reasoning. Some animals have demonstrated the ability to engage in logical reasoning operations. [33] It has even been argued that plants could be considered as being rational. [34]

The German-American philosopher Paul Tillich stated: Man and nature belong together in their created glory – in their tragedy and in their salvation. Engels stated that: Thus at every step we are reminded that we by no means rule over nature like a conqueror over a foreign people, like someone standing outside nature but that we, with flesh, blood and brain, belong to nature. Baruch Spinoza asserted that the whole of the natural world, including human beings, follows one and the same set of natural laws. In his book *The System of Nature*, Holbach states: Man is the work of nature.--He exists in Nature.--He is submitted to the laws of Nature.--He cannot deliver himself from them. The philosopher John Stuart Mill was a naturalist and Mill's naturalism involves the idea that humans and their minds are wholly a part of nature. As such, they are subject to causal laws in the same manner as the rest of the natural world. [36]

Therefore, it suggests that there is a deeper and more meaningful connection between humans and nature. This leads to the inescapable conclusion that humans and nature are as one and the same and that humans are inextricably part of nature and its systems and its influences.

Conclusion

Will science alone ever be able to explain the unknown root causes of disease?

Scientific attempts to discover the root cause of many diseases such as in medical trials and in research and evolutionary medicine have so far failed. One reason may be because science sometimes does not consider anything that may be beyond the scientific discipline.

However, the consummate scientist Albert Einstein stated that “knowledge of the historical and philosophical background gives that kind of independence from the prejudices of his generation from which most scientists are suffering. This independence created by philosophical insight is, in my opinion, the mark of distinction between a mere artisan or specialist and a real seeker after truth”

It can be the case that science adopting a systems thinking approach could aid research and knowledge of how human and nature systems operate in order to discover the root causes as to why systems fail. For example, a possible answer as to why positive feed back loops overwhelm the negative feed back loops in the process of a disease progressing uncontrollably could be that in nature’s systems, the strong tends to overpower the weak. Possible avenues of future research could be whether it might be possible to somehow restore the equilibrium function of the negative feedback loop in order to prevent diseases such as in cancer from progressing uncontrollably by stimulating areas of the brain.

Essentially, everything stems from nature, both terrestrial and extraterrestrial.

As humans are part of nature, the effects of nature’s destructive system failures and the destructive forces in the human body caused by system failures are a common feature to both.

Hippocrates asserted that: we must turn to nature itself, to the observations of the body in health and in disease to learn the truth.

In response to Hippocrates’ assertion, the conclusion is that human body system failures leading to diseases are quite simply a part and parcel of nature and a result of the way nature and its systems work.

Medical research in the future may find effective treatments for some diseases, however, just as we cannot control many aspects of nature, nature’s complex systems will continue to have an influence on why humans, flora and fauna suffer from diseases. It is highly likely that answers to the unknown root origins and causes of many diseases may continue to be elusive.

Consequently, humanity is going to have to come to terms with the fact that devastating diseases are simply an integral part of nature’s complex systems. and as such, it is almost certain that many diseases will never be totally eradicated or controlled.

Appendix

The inspiration to begin the search for answers to the question as to why does the human body go in to self destruct began with meeting Matilda.

Matilda was a pretty, intelligent and charismatic 7 year old girl. She suffered from a rare muscle-wasting disorder Spinal Muscular Atrophy. and was wheelchair bound.

This disorder refers to a group of hereditary diseases that can harm and kill specific nerve cells in the brain and spinal cord. The survival motor neuron gene 1 (SMN1) which produces a protein necessary for motor neurons is the gene that causes Spinal Muscular Atrophy when it is mutated or absent.

So the question was, why was this young child's life blighted in such a cruel way?

Whilst the cause of this disorder is known, it does not explain exactly why this mutated or missing gene was missing in the first place. Hence the quest for answers began.

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