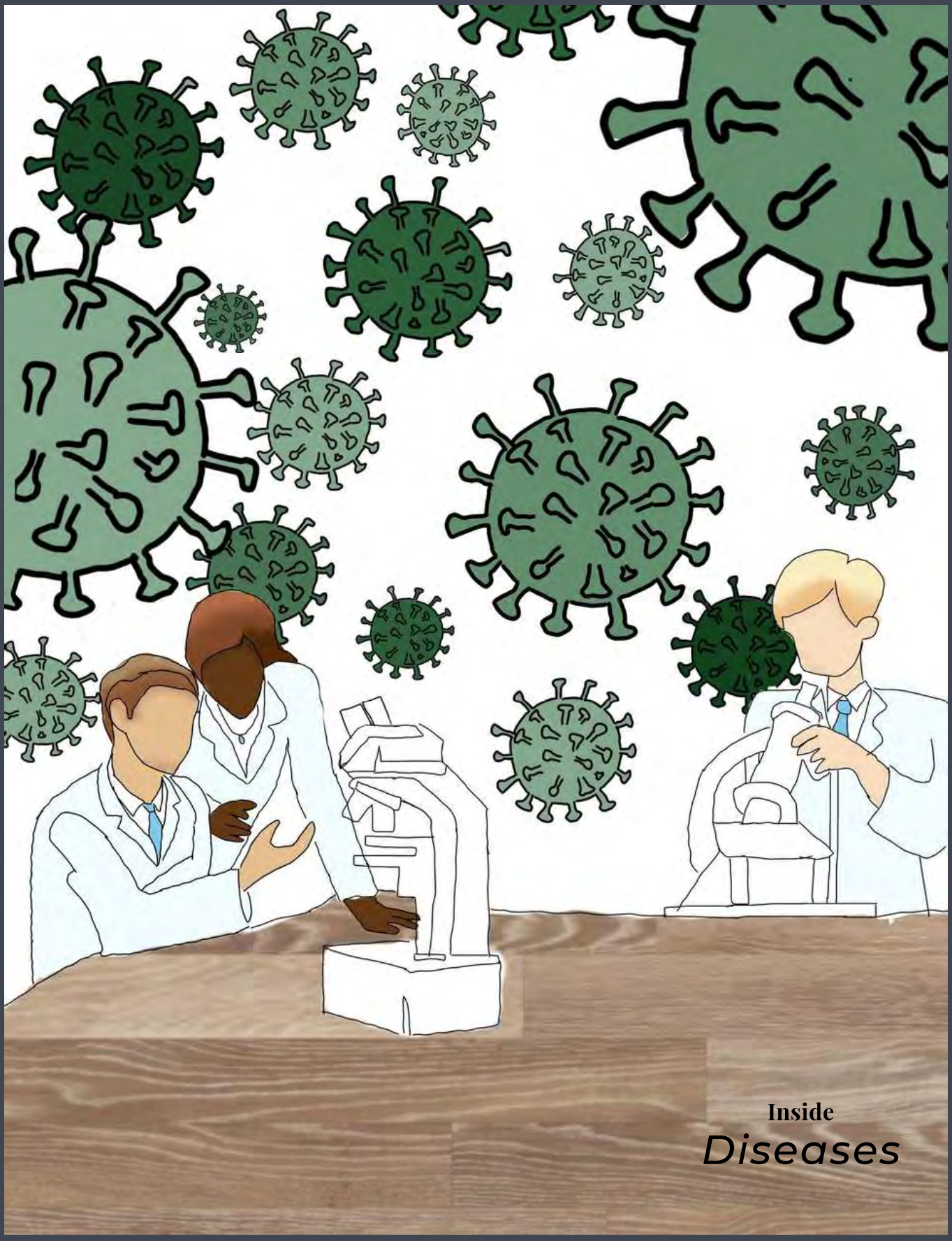
SCIENTIA EST VITA

ISSUE 15



Inside

Diseases

Editorial

In this issue of Scientia Est Vita, we have finally calmed down from all of our chaos and settled for a more *scientific* topic: Diseases!

This half term we'll be exploring a vast array of diseases ranging from animal to human diseases (sorry plants) and from the fascinating to wacky ones. With an abundance of different diseases, it's pretty hard to fall short on what we could possibly talk about relating to the subject.

That's why this issue is jampacked with so many! From Mad Cow Disease to AIWS, science never fails to amuse us with its extravagant wonders.

With the power of science and this new found insight, we hope to enlighten you with all the wisdom that we have acquired from it as well. Since at the end of the day,

Scientia est vita. Knowledge is life.

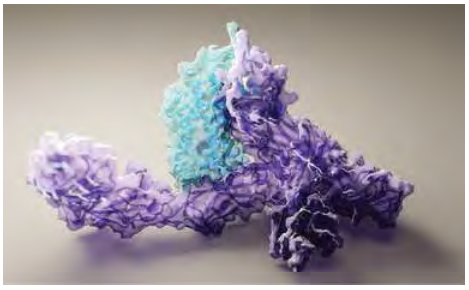
So let us honour this power and the intelligence it grants us!

Bettina Cahilig
HONOURARY EDITOR

RECENT SCIENCE NEWS

ALMOST ALL PROTEINS

Proteins are the building blocks of all life determining things like our DNA, acting as fuel and even destroying cells. A Google-owned company called Deep mind dived into the depths of the long chain amino acids and manged to create an AI that performs CASP - Critical Assessment of Protein Structure prediction competing against the various traditional methods such as the laborious lab techniques of x-ray crystallography to determine the



molecular and atomic structure of crystals. At the CASP14 conference in 2020 the AI has been able to create models of proteins unknown prior and rapid generation of models from sequence information (base pairs) alone!

HARDCORE BATS ROCK THE CAVES

A university study from Denmark recently revealed how bats actually communicate similarly to death metal and Mongolian throat singers! Contrary to the phrase "Blind as a bat", bats do have very sensitive eyesight that allows them to see in conditions we would consider pitch black, they do not have as sharp or coloured sight as we do, yet they use echolocation by emitting sounds that refract off their environment allowing them to map out their environment. Now according to researchers the internal structures used by bats are comparable to those of death metal singers; reaching frequencies of 1 - 5 kHz! This is achieved by using "false vocal folds" which these folds are moved over top of other vocal folds allowing accumulation of weight which produces very low frequencies. intriguingly these bats also have "vocal membranes" - extremely thin light membranes that extend from their vocal chords to assist them in echolocation calls - Humans once had such membranes but were lost through evolution. All this means is that bats have a higher vocal range than Mariah Carey!!

FIRST STEPS TO LIVING ON THE MOON: ARTEMIS 1 LAUNCH

If you haven't heard already, recently there was a first launch of a mission which starts on the development of permanent life on the moon. Artemis I is the world's most powerful rocket which lays the foundation for the astronaut boarded Artemis II then a return to the lunar surface with Artemis III. To put it simply the launch procedures of Artemis I were "off by less than 0.3 percent in all cases across the board". The main mission of this shuttle is to indulge in a series of 10 small science investigations and technology demonstrations, called CubeSats which all have their own set mission to fill gaps in our knowledge of the solar system , hopefully that benefit the future designs of missions of exploring the moon and beyond.

Huntingtons

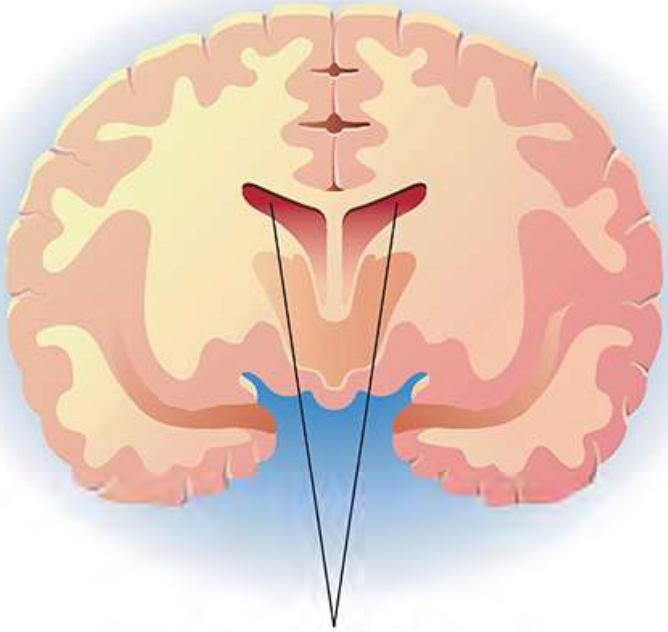
Huntington's disease is a genetically passed on disease which has a 50% chance of being passed down from your parents to you.

Symptoms of Huntington's disease can include:

- difficulty concentrating and memory lapses
- depression
- stumbling and clumsiness
- involuntary jerking or fidgety movements of the limbs and body
- mood swings and personality changes
- problems swallowing, speaking and breathing
- difficulty moving

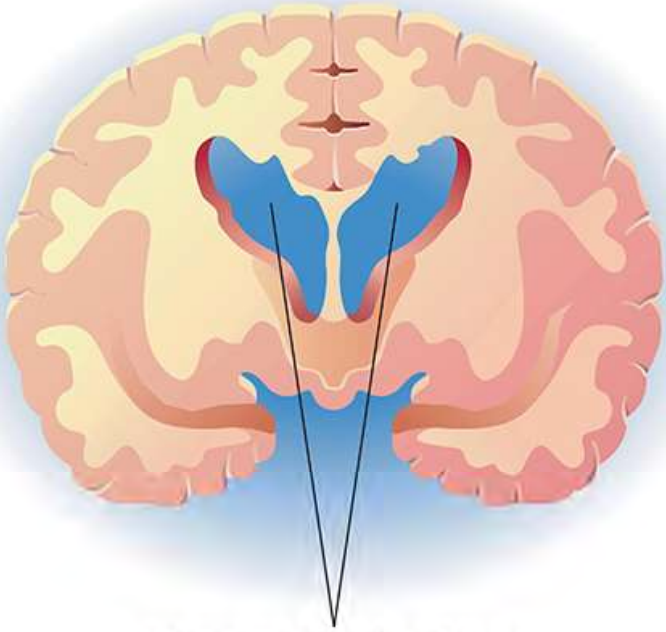
Huntington's disease usually starts at 30-50 years old since it is dormant and as the NHS would say "It gets gradually worse over time and is usually fatal after a period of up to 20 years."

Normal brain section



Normal frontal horns of the lateral ventricles

Huntington's disease



Enlargement of the frontal horns of the lateral ventricles

Rabies Lyssavirus

Origins

Rabies virus to this day is one of the most deadliest viruses at large, causing 59,000 deaths world wide each year.
It is within the Lyssavirus genus though they are often associated with each other; named after Lyssa, the Ancient Greek spirit of madness and rage.
Rabies can be dated back 4000 years, the earliest mention of death via dog bite was in the Middle East dated c. 2200 B.C. - from the city of Eshnunna Mesopotamia.
No symptoms were mentioned meaning that it cannot be proven the cause of death was via Rabies, though bats weren't recognised as a host of rabies, the risk of contracting it from susceptible animals was certainly present.

What is rabies?

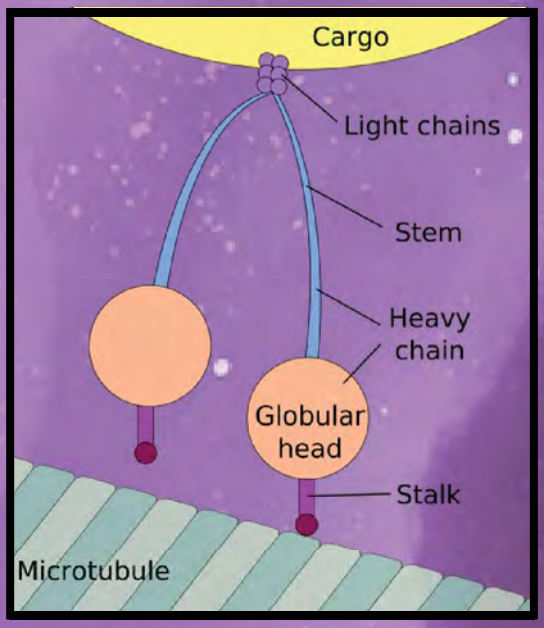
The Lyssavirus is an incredibly simple virus, only made up of 5 proteins:

- Nucleoprotein - Encapsulates genetic material as a basis for replication
- Polymerase - A multifunctional enzyme that catalyses the start of replication
- Matrix - Coats the virus (acts as a medium between the core and outside of the virus)
- Glycoprotein - Unknown. It is thought that this allows the virus to enter a cell membrane yet we do not know what receptors it stimulates in this process
- Phosphoprotein - May play a role in the transport of the virus. Since the viruses goal is the nerve cells of its host which can be fairly long, it uses the neurones endogenous transport system or dynein motor complex (We'll get onto that) to travel to the cells main body

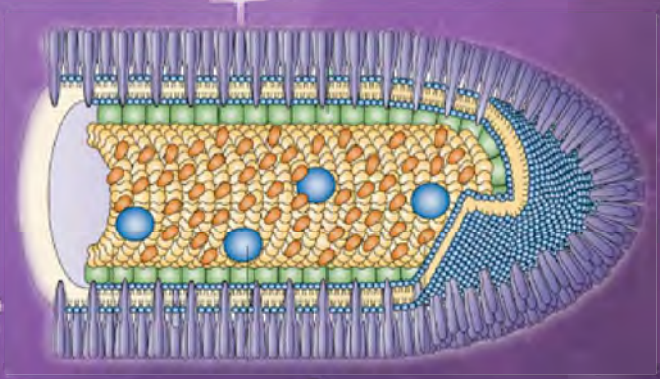
How it happens

90% of the time it starts with a bite from a wild animal carrying millions of viruses in it saliva and pushes them deep into your tissue, it's goal is your nerve cells.

You might be thinking how Lyssa travels through your body and if not, too bad I'm telling you anyways!



These are dynein motors, they are actual motors that travel along the axon of the neurone, they are made of 50 different proteins (10x more than Lyssavirus) and look like a little pair of shoes! Lyssa uses its Phosphoprotein to hijack the motor and head for the nucleus of the cell.



Here's what the structure of the virus looks like!

Your Immune Response

Usually when an infection happens your civilian cells are crucial in your immune response, when your cells are infected they start to produce thousands of a special family of proteins: Interferons. These Interferons do 3 main things:

- Alert the immune system to make antivirus weapons
- Tell your cells to shut down their protein factories meaning viruses can't replicate for a while using the cells resources
- Tell your cells to become super transparent and make loads of MHC Class 1 molecules or little display windows of the products made inside the cell

These windows allow your immune system to see if the cell is infected! This way if a cell is forced to make virus parts, your immune system will see these and order the cell to kill itself. This is one of the most powerful methods of wiping out an infection.

Unfortunately Lyssa blocks the neurones from making these interferons which is why it can take years for any symptoms of the virus to show up.

Infected Neurones

Your CNS is a very fragile part of you meaning that your immune system has to be extremely careful as a few T-Cells causing havoc in the brain is a quick way to die - So they aren't free to enter the nervous system, they have to be invited in and can be kicked out too.

To protect themselves, nerve cells can order T-Cells to self destruct if they think they're being dramatic, Lyssa found a way to control this system and can give out orders from infected neurones, the virus uses our own immune system to combat our immune system - So as your most powerful defence arrives, they can be ordered to commit suicide.

Although contrary to this in brain tissue samples of rabies patients shows minimal damage meaning it is actually thought that it messes up neurone communication so that it cant function. This causes drowsiness, unconsciousness then a coma In a cruel way, this is the easy route to death. Some patients experience distressing symptoms before death:

Hydrophobia

The main symptom which appears in over half of patients - One of the things your CNS controls is involuntary reflexes such as swallowing. When you try to drink any fluid and it enters the mouth, the muscles in the neck spasm and close making it impossible to swallow, even the sight of water can cause these reactions even if you are dying from thirst.

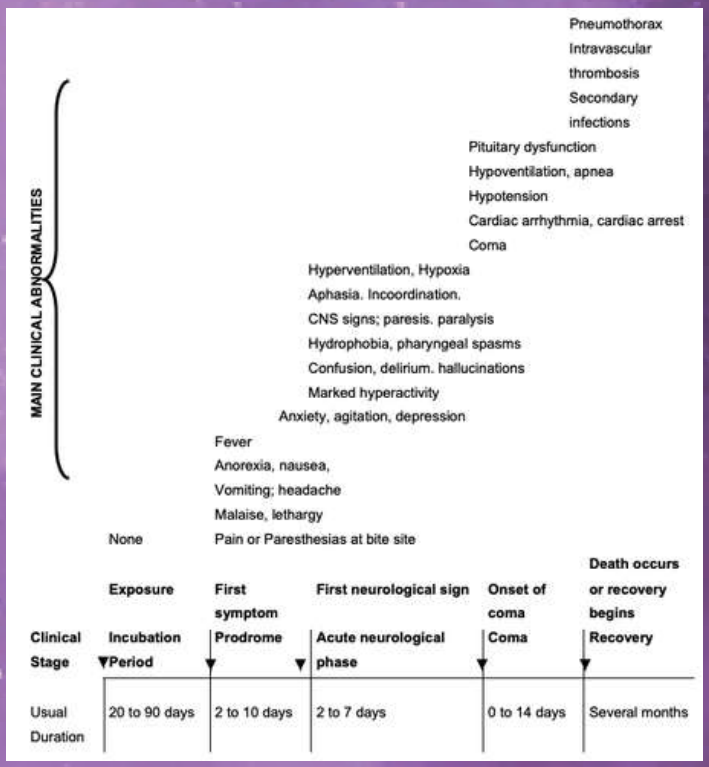
Post Infection

The virus begins to leave the brain and travel through neurones to the rest of the body, we have no clue how this works as it travels up to the brain and decides to leave. It's main goal is the salivary glands in order to allow transmission through bites.
By now you would already be dead, rapidly developing encephalitis, a swelling of the brain which have symptoms ranging from lethargy to paralysis and slowly each organ fails as you fall into a coma, ending the suffering with death.

There is no proven effective therapy once symptoms start to show - barely anyone has survived past that point. It is the most deadliest virus known to us having a 100% fatality rate if untreated though we aim to eradicate this disease by 2030 as there is a way to prevent rabies from occurring - Vaccinations!!

Vaccinations

Because Rabies is so slow it is easy to prevent this with a vaccination, though not all hosts leave a huge gash, noticing a bite (from a bat most likely) that has lyssavirus, it is super important to go get checked by a doctor since their teeth are so small you might not notice the bite. It still kills ~60,000 a year which almost half of them are children.



BY MATTHEW GOWARD 11HBL

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Schizophrenia

By Severin Dewhirst-Bell 11HBL

Schizophrenia is a severe mental disorder where people interpret reality abnormally.
This could be experienced through a range of unique symptoms

Hallucinations and delusions are the positive symptoms of Schizophrenia, although they may not seem that positive!

Positive refers to the symptoms that make things start happening

Hallucinations – Hearing or seeing things that do not exist outside of the mind

Visual: You might see lights, objects, people or patterns. Often it is loved ones or friends that have died. You may also have trouble with depth perception from a distance

Tactile: This creates a feeling of things moving on your body, like hands or insects

Olfactory & Gustatory: You could experience good or bad smells and tastes. You may believe that you are being poisoned and refuse to eat

Auditory: You may hear voices in your head. These voices could be angry and demanding or whisper and murmur

Delusions

False beliefs that aren't based in reality

Jealousy
They may believe that your spouse or partner is unfaithful to them, this causes lots of damage to treasured relationships. In some cases, it could also cause violent or obsessive behaviour

Religious
They may believe that they have a special relationship with a deity or that they are possessed by a demon

Grandiose
They may have an unrealistic sense of superiority, this could include knowledge, worth, power, or identity.

Erotomantic
They may believe that someone is in love with them, this would usually be someone of a higher status than themself

Referential
They may believe that public forms of communication are a special message for them, this could be a TV presenter's gesture or a song lyric

Precursatory
They may feel that someone is after you or that they're being stalked, hunted, framed or tricked

Somatic
They may feel like they have some bizarre illness or health problem like worms under their skin or damage from cosmic rays

Flattening
They talk in a way that sounds flat or without emotion. They may not smile normally or show facial expressions

Lack of Pleasure
They may not seem to enjoy anything anymore

Anhedonia

Affective Flattening

Negative effects are as advertised... Negative. I hope you weren't expecting different. As you may be able to guess though, Negative refers to the things that start happening

Avolition

No follow through
They may have trouble staying on schedule or finishing what they start. Sometimes they might not start at all

Apathy / Asociality

Withdrawal
They may no longer make plans with friends or become a hermit

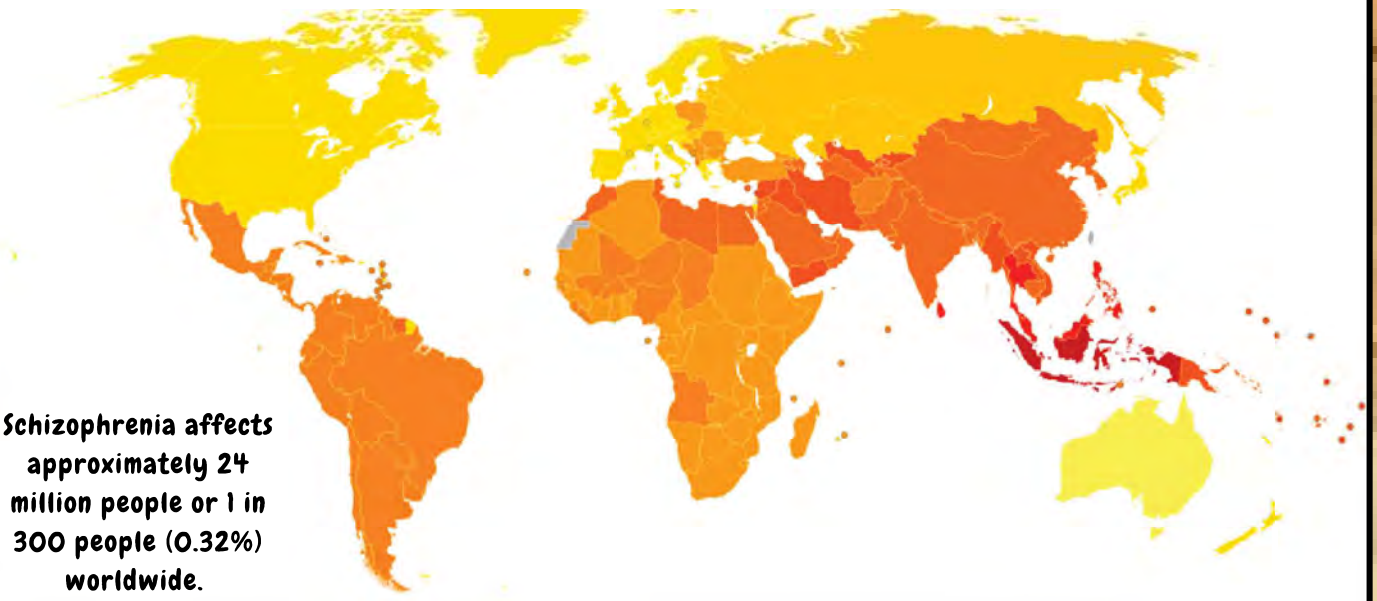
Alogia

Trouble with Speech
They might not talk as much or show any feelings.

Causes of Schizophrenia

- The exact cause of schizophrenia is still unknown.
- Experts believe that certain situations can trigger schizophrenia such as a traumatic life event or misuse of drugs.
- Symptoms of schizophrenia usually start around the ages of 16 and 30.

Schizophrenia does not cause violence or split personality and it is important to understand that people with the illness are not bad people, and certainly should not be treated like that.
If you experience symptoms of schizophrenia, see a GP as soon as possible. It's better to treat schizophrenia sooner rather than later.
There is no single test for schizophrenia, it is usually diagnosed by a mental health care professional.



Schizophrenia affects approximately 24 million people or 1 in 300 people (0.32%) worldwide.

ALICE IN WONDERLAND SYNDROME

By Luna Victoria Fuya Echeverría 11RMS

More like a Nightmare-land, Alice in Wonderland Syndrome (AIWS), also known as Todd's syndrome or dysmetropsia, is a neuropsychological condition that causes a distortion of perception.

The brain alterations responsible for AIWS are located in TPO-C, where the dorsal and ventral streams of visual system are integrated with somatosensory and vestibular inputs.
The symptoms manifested on the patient are mainly related to the alteration of body image and perception of external objects wrongly, as well as strong hallucinations.

SYMPTOMS

AIWS affects the sense of vision, sensation, touch and hearing as well.

In terms of visual distortions, the person might see things bigger than they actually are (Macropsia) or the opposite; smaller (Micropsia), collectively known as metamorphopsias. They can also appear closer (Pelopsia) or farther (Teleopsia), and experience illusions of expansion or reduction.
More often than not, the head and hands seem disproportionate, and the person perceives growth of parts of the body more than the reduction of such.

Other commonly associated symptoms of AIWS are migraines, nausea (leading to vomiting), hemi-craneal headache, dizziness, visual derangements and agitation. However, there are other symptoms which are less frequent, yet present on the patients who experience this syndrome: Loss of limb control and coordination, memory loss, lingering touch and sound sensations and emotional instability.

Hallucinations

Some people experience strong hallucinations, visualising things that are not there and they might have misconceptions about certain situations and events, confusing the reality with their visions.

A hallucination associated with AIWS is Zoopsia: It involves the hallucination of either swarms of small animals or large group of larger ones, which can have a realistic appearance. This can be terrifying for the patient...imagine seeing hundred of ants at your feet, a tigger, an elephant? All appearing from nowhere.

Hearing and Time Disortions

They might also lose sense of time. The lack of time and space perspective can also lead to a distorted sense of velocity.

For people with Alice in Wonderland Syndrome, time can either pass incredibly slow or too swiftly.

Those experiencing AIWS doesn't only have to deal with visual distortions, but also the distortion of sound perception. These disturbances can include the amplification of soft sounds or misinterpretation of common sounds, distortion in pitch and tone and hearing indistinguishable and strange voices, noises or music.

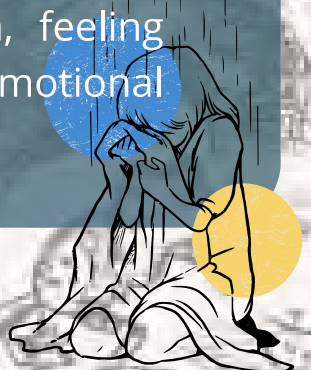
CAUSES OF AIWS

The causes for this rare and terrifying syndrome are still unknown. Although some of the known causes are typical migraine, temporal lobe epilepsy, brain tumors, psychoactive drugs and Epstein-barr-virus infections.

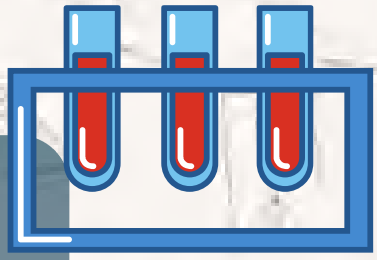
Unfortunately, there is no cure for Alice in Wonderland Syndrome. Despite this, there are some treatments such as meditation, psychotherapy and relaxation techniques, therapies such as electroconvulsive therapy and transcranial magnetic simulation.

CONSEQUENCES OF SUFFERING FROM AIWS

People suffering from Alice in Wonderland Syndrome can also suffer from depression, anxiety and frequent panic attacks due to their altered perception of reality and the hallucinations, which is with reason overwhelming and terrifying for the patient.
Due to the frequent abnormal stimuli, such as the distorted or amplified sounds) and the altered visual distortions, hallucinations and perceptions of reality, they can also feel extremely disorientated and lost, suffer from severe fatigue, have disturbances of their sleep, loss of appetite, persecutory and somatic delusions and psychomotor retardation. Hearing and time distortions can cause the person to develop paranoia, feeling threatened and watched, and this affects their mental, emotional and physical health.



HOW CAN AIWS BE DIAGNOSED



MRI scan: An MRI can produce highly detailed images of your organs and tissues including your brain.

Electroencephalography (EEG): An EEG can measure the electrical activity of the brain.

Blood tests: By having blood tests carried out, doctors are able to identify viruses or infections that could be causing Alice in Wonderland Syndrome, such as EBV (Ebstein-barr-virus).

It is estimated that Alice in Wonderland syndrome occurs among about 10-20% of the world population.

AIWS primarily affects children and adolescents, however adults do suffer from this syndrome as well.

AIWS seems to be hereditary. This means that if your parents or your ancestors suffered from this condition, you are likely to experience at some poit throughout your life.

Alice in Wonderland syndrome; a terriying, rare and extraordinary condition, which is more than following a random white rabbit with a tic-tacting clock

The disease famed for the madness that gave it its name - what is it, really? What does it do, how does it work? Can it really affect humans as well as cows?

Mad Cow Disease

First appearing in 1986, Mad cow disease does have a scientific name, though it's a lot less fun - BSE, or bovine spongiform encephalopathy. Taking it apart, 'bovine' means it affects cattle, 'spongiform' refers to the spongy appearance of an affected brain, and 'encephalopathy,' simply put, means brain disease.

Most scientists believe BSE to be caused by a prion, a particularly nasty kind of protein. It sneaks around causing chaos while the cow's body is entirely unaware of it, so the cow can't fight the disease. Infected cows behave as the name suggests. They have trouble getting up and walking around, and some get aggressive and violent. The cows act as insane as a creature that looks to be powered by a single brain cell can.

Serious gross alert - cows get fed other cows.

The parts of cows that people don't eat get turned into a lovely multipurpose cow powder, and some of it is used as animal feed. And if bits of infected cow get turned into cow feed, there's a chance that the other cows will ingest the prion and become infected themselves. In fact, Britain only banned the feeding of animal produce to animals in the 1990s. The FDA only banned it in 2004. (This animal produce, by the way, also includes cow blood and chicken poop.)

An.L.How
11HBL

Oh, and it's impossible to properly diagnose mad cow or vCJD (see next page) until after death, since it requires having a look at the victim's actual brain.

Scientia est Vita

Mad Cow Disease IN HUMANS

People do not get mad cow disease. We are not cows, so it stands to reason that we are not affected by a disease specified as 'bovine.' However, we *can* get a variant of BSE called variant Creutzfeldt-Jakob disease, which is a terriblly complicated name, so we generally call it vCJD (It's not the same as normal CJD.). It's caused by the same prion as BSE and, like BSE, is always fatal. The first unfortunate soul to contract this was a Stephen Churchill, 19, in 1995. Most victims of vCJD came from the UK. Luckily, since the first infection in 1995, there have only been 233 recorded cases in the whole world.

Symptoms of vCJD include:

- severe depression
- withdrawal from family, friends and the world around you
- anxiety
- irritability
- difficulty sleeping (insomnia)

- loss of intellect and memory
- changes in personality
- loss of balance and co-ordination
- slurred speech
- vision problems and blindness
- abnormal jerking movements
- progressive loss of brain function and mobility

In vCJD, psychological symptoms (to do with behaviour and emotion) develop first, then the neurological symptoms (to do with the nervous system) hit after around 4 months.

Victims usually die within a year of developing symptoms, because the immobility caused by the disease leaves them susceptible to infection.

Normal prions are proteins which fold themselves into a 3D shape. This allows them to be useful within the body. However, sometimes the folding goes wrong and the prion cannot be used. These misfolded prions build up in the brain if they aren't recycled.

In the brain, misfolded prions multiply and cause brain cells to die, form deposits (plaques) within the brain, and even make holes in the brain until what is said by some to be the vessel of one's very being resembles a sponge. In short, it's nasty.

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LYMPHATIC FILARIASIS

Lymphatic filariasis, commonly known as elephantiasis, is a painful and disfiguring disease. It is caused by infection by parasites called nematodes of the family Filariodideaea that are transmitted through bites of infected mosquitos. Mosquito transmitted larvae are deposited on the skin where they enter the body. The larvae migrate to lymphatic vessels where they turn into adult worms continuing a cycle of transmission.

In places where filariasis is transmitted, everyone is affected. While the infection may be acquired during childhood it is visible manifestations such as limbs oedema may occur later in life, causing disabilities. In endemic countries, lymphatic filariasis has a major social and economic impact.

Lymphatic filariasis affects over 120 million people throughout the tropics and sub-tropics parts of Asia, Africa, the Western Pacific, and also parts of the Caribbean and South America.

Helping the Not-so-Healthy Heart

By Bettina Cahilig 11RMS

The Heart is a vital organ in our body which helps keep us alive by supplying oxygen and nutrients all around the body via the bloodstream. However, there are some conditions which prevent it from doing its job correctly. Unfortunately, Heart Disease is the number 1 cause of death according to the WHO [1], meaning that education and awareness on this is very important. But thankfully, there are many charities and organizations such as the British Heart Foundation and the World Heart Federation that aim to educate and raise money for research so that people and families affected by this can live longer and more fulfilling lives.

Conditions: [2]

There is a long list of different heart problems ranging from irregular heart rhythms to high blood pressure. However, since this article (unfortunately) can't go on forever, here are a few common issues:

Arrhythmias

These are conditions which lead you to have an irregular heart beat. This means that it can either be too fast, too slow or just irregular in general. It can cause the person to feel tired, breathless or uncomfortable. There are many types of arrhythmia such as:

- Supraventricular Tachycardia (SVT): This causes a very fast heart rhythm as the electrical signals from the atria are not travelling normally to the ventricles
- Atrial Flutter: Where the atria contract at a much faster rate compared to the ventricles
- Heart Blocks: Where the heart beats at a slow rate due to a blockage or delay in the conduction system between the atria and ventricles.

These conditions can be inherited but they can also be triggered by factors such as viral illnesses, alcohol and medication.

Cardiovascular Heart Disease (CVD)

This is an umbrella term used to describe conditions that affect the heart and how it circulates blood. This includes Hypertension, Vascular Dementia and Angina. There are many symptoms of CVD depending on what condition you have such as fatigue, swollen limbs, chest pain, palpitations and breathlessness. However some of the risk factors are things that are out of our control like family history, ethnic background and age. But the effects of this can be reduced/prevented if you don't smoke, don't drink alcohol and stay physically active.

Coronary Heart Disease (CHD)

Coronary Heart Disease (also known as Ischaemic Heart Disease) is caused by a build-up of a fatty material called atheroma within coronary arteries causing them to narrow in a process known as atherosclerosis. This means that less oxygenated blood will be able to reach the heart muscle.

If a piece of the atheroma breaks off, it can trigger a blood clot to form, cutting off the blood supply to the heart, resulting in a Heart Attack. All it takes is a partial blockage (NSTEMI) to starve the muscle of oxygen and blood. If the clot forms in an artery which supplies the brain with blood, it can lead to an Ischaemic Stroke. This is when brain cells get damaged due to a lack of oxygen, affecting a person's speech, movement and thoughts depending on which area of the brain has been affected.

Common symptoms of CHD include chest pain, shortness of breath and pain that travels throughout the body. These are known as Angina. Just like CVD, risk factors of CHD include: family history, age, ethnicity, high blood pressure and high cholesterol.

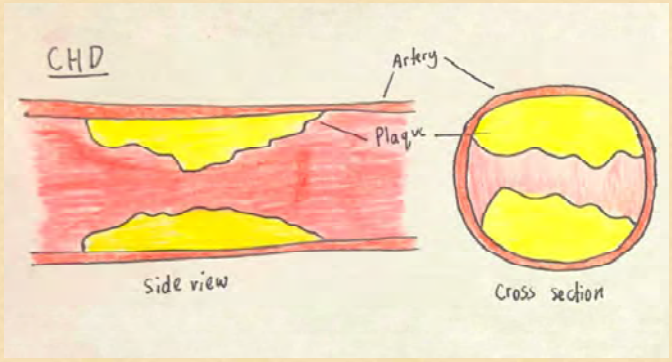
Familial Hypercholesterolaemia (FH)

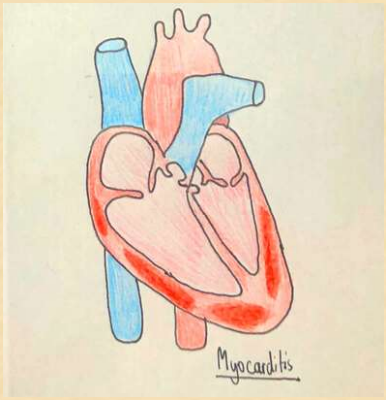
FH is a genetic condition that is passed down through families which leads a person to have exceptionally high levels of cholesterol in their blood. It's caused by a genetic mutation which prevents your liver from being able to remove any excess LDL (bad cholesterol) in your blood. This means that LDL levels in your blood will remain high, putting you at a greater risk of having a Stroke or Heart Attack at a younger age.

Symptoms include:

- Tendon Xanthomata (swelling on your knuckles, knees or Achilles made from cholesterol)
- Xanthelasmas (small yellowish cholesterol lumps near the inner corner of your eye)
- Corneal Arcus (a pale white ring around the iris)

Even though there is no cure for FH, it can be treated through the use of Statins and by maintaining a healthy diet and weight.





Myocarditis

Myocarditis is the inflammation of the myocardium (heart muscle). It can occur after a viral infection as inflammation is the body's natural way of responding to harm, such as infections or injuries. It can develop quickly and sometimes be long-lasting. In rare cases of this, it can scar the heart muscle making it harder for the heart to pump blood. Sometimes it can occur with Pericarditis (inflammation of the lining around the heart) which is known as Myopericarditis since the two conditions are pretty similar. Symptoms include tiredness, flu-like symptoms and palpitations.

Cardiomyopathy

Cardiomyopathy is a type of disease which affects the size, shape or thickness of the heart muscle. It can either be acquired due to other heart conditions or inherited due to a faulty gene that's been passed down through a family .It can cause an abnormal heart rhythm, swollen legs and chest pain/ a heavy chest. This can be improved with the help of treatment.

Different kinds of cardiomyopathy include:

- Hypertrophic Cardiomyopathy (HCM): where the heart muscle cells enlarge and the walls of the chambers thicken.
- Dilated Cardiomyopathy (DCM): this causes the ventricles to grow larger as the walls thin and stretch.
- Arrhythmogenic Right Ventricular Cardiomyopathy (ARVC): this usually appears in adulthood and is when the muscular wall of the heart starts to break down over time, increasing the risk of Arrhythmia and sudden death.
- Takotsubo Cardiomyopathy: a cardiomyopathy that is not inherited but rather caused by emotional and physical stress. This can get better within a few weeks.

Tests and Treatments: [3+4]

Since there are loads of heart conditions and diseases to look out for, it's important that we have a plethora of different tests in order to find them and treatments to alleviate them. Some of them involve invasive operations and procedures while others rely on scanners, medications and technology thanks to recent innovations.

The main types of tests for heart conditions are:

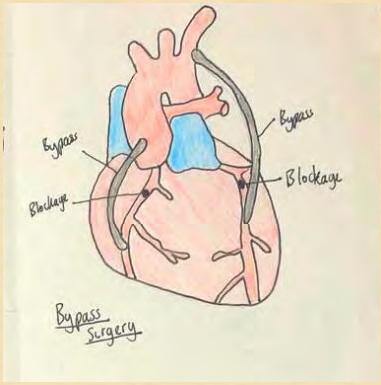
- **Angiogram:**
  This is also known as a cardiac catheterization since it requires the doctor to insert a catheter through an artery in either your arm or groin in order to reach the heart. Using an X-ray and a special dye, a doctor will be able to see how well the blood is flowing through.

- **Electrocardiogram (ECG):**
  An ECG is a simple test used to record the rhythm and electrical activity of your heart using 10 electrodes that are stuck on your chest, arms and legs.

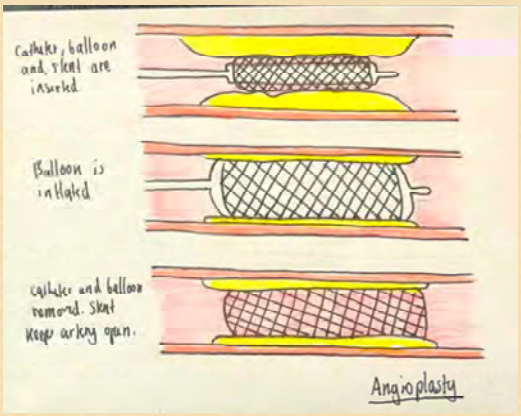
- **Echocardiogram:**
  This is a non-invasive test which uses soundwaves to make a detailed picture of your heart and is pretty similar to an ultrasound test.

While the main types of treatments are:

- **Coronary Bypass Surgery:**
  This is used to treat CHD and is a type of open heart surgery. This is when the surgeon uses a piece of blood vessel to make an alternate route for the blood to travel around the blockage.



- **Angioplasty:**
  This is also used to treat CHD and is a less invasive procedure compared to Bypass Surgery. It's usually done at the same time as an Angiogram and is when they inflate a small balloon in the artery to open it up and place a stent in there to keep it open.



- **Medicines:**
  There are loads of medications that can be used to keep your heart healthy, ranging from anticoagulant medicines, antiarrhythmic medicines to cholesterol-lowering medicines such as Statins and Ezetimibe [5].

New Discoveries + Innovations:

As mentioned previously, many recent innovations have been made which help us better understand and treat cardiac conditions such as the ones above. Some of these discoveries change how we perceive and view a condition while others allow us to improve how we treat them.

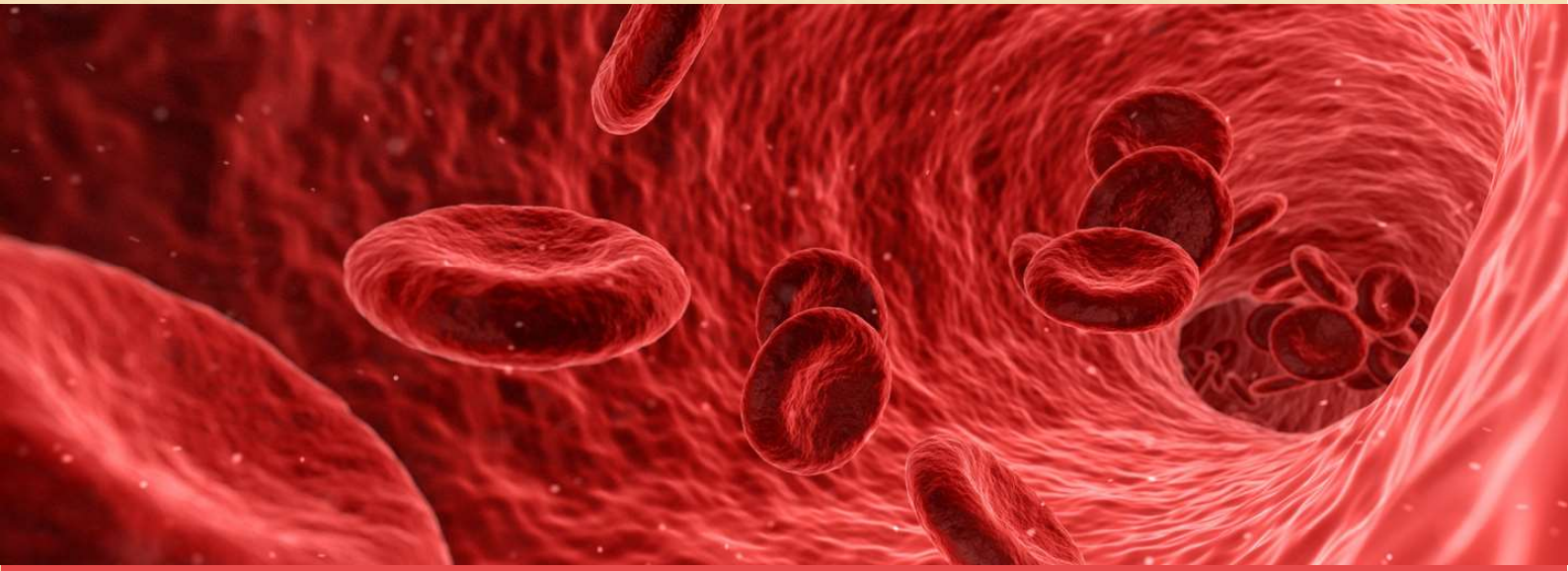
An example of this is a new injection called Inclisiran. It is part of a new class of medicines called "gene silencing drugs" because of its ability to turn off the PCSK9 gene, improving the liver's ability to remove bad cholesterol (LDL) from the bloodstream. Previously, a person with high cholesterol levels would have to take Statins or Ezetimibe tablets daily. But Inclisiran only needs to be injected into you every couple of months saving lots of time and hassle. However, since it was only approved for use by the NHS in December 2021, it's only recommended for specific cases and cannot be widely used yet.

In addition to this, around the same time as Inclisiran, a new type of heart scanner called HeartFlow was developed. This uses a CT scanner and AI to create a 3D image of the heart and to predict where any blockages might be. This type of scanner is a lot quicker and safer than procedures such as Angioplasties while still providing enough information. HeartFlow is being used in some hospitals around the country but isn't widely available.

With discoveries and advancements such as these, helping a not-so-healthy heart will become much easier. It won't eradicate heart diseases all together but it means that more patients with these conditions can go on to live more fulfilling, healthy and longer lives.

References:

- [1] https://www.who.int/news-room/fact-sheets/detail/the-top-10-causes-of-death
- [2] https://www.bhf.org.uk/informationsupport/conditions
- [3] https://www.bhf.org.uk/informationsupport/tests
- [4] https://www.bhf.org.uk/informationsupport/treatments
- [5] https://www.nhs.uk/medicines/ezetimibe/



STIRRING SLEEP DISORDERS

BY MEGAN DOHERTY
11MRI

Sleep: What it is and why it's necessary:

Sleep is a period of inactivity and unconsciousness which is supposed to have a result of feeling rejuvenated and refreshed (although some conditions prevent this!).

It's extremely important for nearly all animals, with researchers believing that 'sleep may promote the removal of waste products (toxins) from brain cells'. Along with the fact proper sleep: improves concentration and productivity, reduces risk of heart disease and stroke and promotes growth and development (especially in children).

Insomnia

This is the most common sleep disorder and chronic insomnia is categorised by difficulty staying/falling asleep for a minimum of at least 3x per week for 3 months.
10% of people suffer from chronic insomnia while 1/3 of people experience insomnia symptoms.
Factors increasing it's likelihood are: genetics, stress, age (chiefly those 65+) and being female.

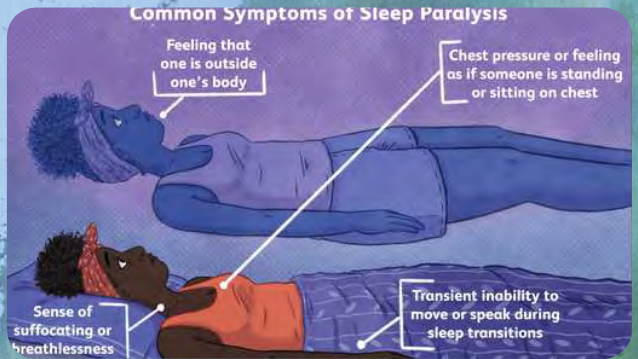
Types of insomnia are:

- Acute insomnia- this lasts from a few days to a few weeks. This is usually from a shift in environment (e.g. jet lag) or stressful event.
- Chronic insomnia- this can have an underlying medical cause: like diabetes, sleep apnea or hyperthyroidism. Or mental health conditions like depression and anxiety.
- Maintenance insomnia- difficulty staying awake or waking at an early time you dislike then not being able to fall back asleep.

Insomnia can be remedied by over the counter medicine.

Sleep Paralysis

This is a condition where you cannot move your body, you're in a 'locked in' state as you are waking up/falling asleep, while simultaneously experiencing frightening visions/sensations. It's terrifying and confusing for the individual involved. If you experience it when you're asleep/falling asleep, it's called 'hypnagogic' or 'predormital sleep'. When waking up its 'hypnogogic' or 'postdormital sleep'.



This most understood cause is disruption of the Rapid Eye Movement (REM) stage of sleep. The stage of sleep where dreaming and memory consolidation occur. So your body operates like it does when you're awake except you lose muscle movement.

Exploding Head Syndrome

Imagine hearing a gunshot ring clear or an abrupt clap of thunder. This is one of the classic sounds people with exploding head syndrome can hear. Officially it's a loud noise or sensation (like a flashing light) experienced painlessly in less than a second. People who experience this also usually experience sleep paralysis. This wasn't first described in medicine until 1876 and wasn't officially recognized a sleep disorder until 2005 (fairly recent).

Sleep Apnea

This is a very serious disorder which impacts your breathing and cause health problems that shorten your lifespan by 12-15 years. Your breathing starts and stops abnormally, usually stopping for 10-20 seconds upwards of 5 times an hour.

This lack of oxygen in your blood, means your brain briefly wakes you up so you can kick start the breathing process. This heavily disturbs sleep. You don't feel yourself waking up, your mind does this on it's own.

Anyone can have sleep apnea and often it goes undiagnosed as it happens while you're unconscious and is brief. Those most at risk have: family history of sleep apnea, are middle aged, overweight, have a large neck and features putting them more at risk- like a large tongue. Medical diseases like Parkinson's, asthma and congestive heart failure increase the risk.

There are 2 main types of sleep apnea: obstructive and central. Obstructive accounts for 95% of cases.

-In obstructive sleep apnea, your throat muscles relax to a degree that air can't pass through, obstructing your airways and interrupting your breathing.

-In central sleep apnea, your brain doesn't send proper signals to the muscles to control breathing. This differs to obstructive because there isn't a physical obstruction of your airways.

Symptoms of sleep apnea include: loud snoring, excessive daytime sleepiness, morning headaches, high blood pressure, difficulty concentrating, waking with a sore throat/dry mouth and observed breathing stopping during sleep.

Statistics are stunning:

- It affects more than 936 million people worldwide.
- Around 80-90% of sleep apnea is undiagnosed.
- Sleep apnea increases the risk of heart failure by 140%, the risk of stroke by 60%, and the risk of coronary heart disease by 30%.

Treatments of sleep apnea are different depending on how severe the condition is for the person.

-You could have a tonsillectomy- surgery to remove the adenoids and/or the tonsils is the most common treatment for paediatric OSA.
-You could have jaw repositioning surgery- this helps by moving the jaw forward creating a better positioning for air to enter. This is successful for 85% patients.
-You could have positive airway pressure (PAP) therapy- uses a machine to pump air into your airways while asleep. This has been shown to completely stop snoring and sleep apnea when used correctly. However, 33% of people quit their CPAP machine because they find it uncomfortable to use.
-You could have a tracheotomy- creating a hole in the neck for air to enter through. This is only done in LIFE THREATENING situations as it's extremely invasive and could lead to life long damage.

Narcolepsy

Narcolepsy is a long-term brain condition which causes a person to fall asleep at inappropriate times. It's often caused by a lack of the chemical 'hpocretin', found in the brain, which regulates wakefulness.

Symptoms include: excessive daytime sleepiness, sleep paralysis, sleep attacks (falling asleep suddenly without warning and cataplexy (temporary loss of muscle control resulting in weakness/collapse).

It's quite a rare condition affecting an estimated 30,000 individuals (with many cases unreported) in the UK. 20-40 is the common diagnosis age, with symptoms appearing during adolescence.

There is currently no cure for narcolepsy but taking, frequent brief naps throughout the day is thought to help with daytime drosiness.

Please remember to get the proper amount of sleep your body needs (recommended 8 hours generally, although get what is right for you). If you feel like your sleep has become irregular and is affecting your everyday life negatively, please don't hesitate to talk to parents, healthcare professionals, teachers etc. The right amount of sleep will cultivate your mind and let your cognitive abilities thrive.

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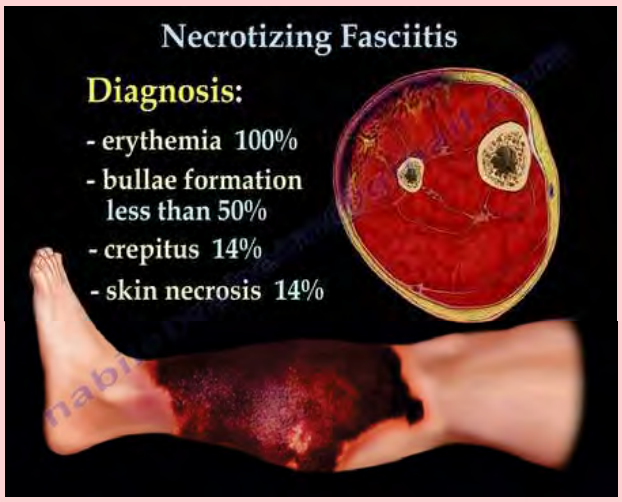
Necrotizing Fasciitis

By Emilia Scofield + Alice Ledger

NECROTIIZING FASCIITIS IS A BACTERIAL INFECTION WHICH EATS AT AN ORGANISM'S FLESH AND KILLS PARTS OF THE BODY'S SOFT TISSUE



CDC TRACKS NECROTIZING FASCIITIS CAUSED BY GROUP A STREP. SINCE 2010, APPROXIMATELY 700 TO 1200 CASES OCCUR EACH YEAR IN THE UNITED STATES. THIS IS LIKELY AN UNDERESTIMATE. ACCORDING TO ABCS DATA , THE NUMBER OF ANNUAL GROUP A STREP NECROTIZING FASCIITIS INFECTIONS REPORTED TO ABCS DOES NOT APPEAR TO BE RISING. SOURCE - CDC.GOV

- To get necrotizing fasciitis, you need to have the bacteria in your body. This typically occurs when the skin is broken. For example, the bacteria can enter your body through a cut, scrape, or surgical wound.

URGENT MEDICAL ATTENTION IS USUALLY RECOMMENDED BY HEALTHCARE PROVIDERS

MAY BE DANGEROUS OR LIFE THREATENING

TREATABLE BY A MEDICAL PROFESSIONAL

REQUIRES LAB TEST OR IMAGING

CAN LAST SEVERAL DAYS OR WEEKS

ONLY CERTAIN RARE BACTERIAL STRAINS ARE ABLE TO CAUSE NECROTIZING FASCIITIS, BUT THESE INFECTIONS PROGRESS RAPIDLY SO THE SOONER ONE SEEKS MEDICAL CARE, THE BETTER THE CHANCES OF SURVIVAL. THE BACTERIA ACTUALLY CAUSE EXTENSIVE TISSUE DAMAGE BECAUSE THE TISSUES UNDER THE SKIN AND THOSE SURROUNDING MUSCLE AND BODY ORGANS ARE DESTROYED; NECROTIZING FASCIITIS IS EXTENSIVE AND CAN LEAD TO DEATH.
(SOURCE: APIC.ORG)

The History of Necrotizing Fasciitis

The infections have been described as early as the **fifth century B.C.** based on written accounts of **necrotizing fasciitis** by Hippocrates. More than **2,000 cases** of this condition were reported among soldiers during the Civil War. Cases in the U.S. are generally infrequent, although **small epidemics** have occurred, such as the 1996 outbreak in San Francisco among injection drug abusers using contaminated "black tar" heroin.

The first English description for necrotizing soft-tissue infection was by British surgeon **Leonard Gillespie** and British physicians **Gilbert Blaine** and **Thomas Trotter** in the 18th century.

Sources -apic.org + en.wikipedia.org

Noble cases

1994: Lucien Bouchard, former premier of Québec, Canada

1994: A cluster of cases occurred in Gloucestershire, in the west of England

1997: Ken Kendrick, former agent and partial owner of the San Diego Padres and Arizona Diamondbacks

2004: Don Rickles, American stand-up comedian, actor, and author

2004: Eric Allin Cornell, winner of the 2001 Nobel Prize in Physics

2005: Alexandru Marin, an experimental particle physicist

2006 Alan Coren, British writer and satirist

2009: R. W. Johnson, British journalist and historian

2011: Jeff Hanneman, guitarist for the thrash metal band Slayer

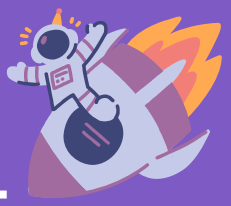
2011: Peter Watts, Canadian science fiction
author

2014: Daniel Gildenlöw, Swedish singer and songwriter

2015: Edgar Savisaar, Estonian politician

2018: Alex Smith, an American football quarterback

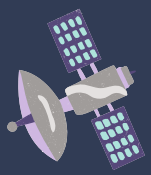
2001: A SPACE DISEASE



Yvette Esteller Montero - 11KGD

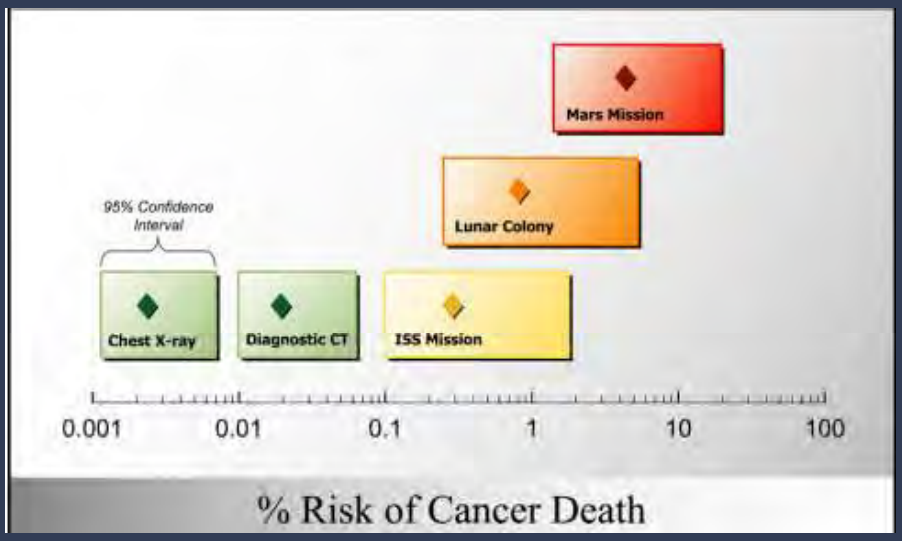
As if space didn't have enough dangers already, astronauts have the added pressure of their own health in space. Both low, medium and high doses of ionising radiation in the long run can cause lifetime problems and diseases. This radiation comes from galactic cosmic rays, solar particle events of which astronauts are expose to during long duration spaceflight.

This radiation can cause the following:
-Cardiovascular Pathologies
-Cararacts
-Digestive Diseases
-Repiratory Diseases
-Atherosclerosis
and many more



Atherosclerosis can be caused by gamma ray exposure and is a disease when then the arteries become clogged with plague or fatty substances. This causes obstructions in the arteries and can lead onto potentially dangerous heart conditions and put astronauts at a high risk of stroke

Another highly dangerous disease astronauts face is the increased risk of cancer. Due to being exposed to this radiation on daily basis, the astronaut's DNA is damaged to the extent of causing large scale gene changes which causes genome changes and instability. This mixed with tumor-promoting inflammation causes for a catastrophe of symptoms which enable the growth of carcinogenic malignant tumors. This can all cause breast and lung cancer, acute myeloid leukemias



In Conclusion, if astronauts doing 200 day missions suffer high consequences from small dose radiation, it makes you wonder what would happen in longer and more dangerous missions. No longer is the worry aliens but the health of our own space sailors.

Leukemia

What is Cancer?

Cancer is a disease. It occurs when some cells start to grow uncontrollably. It can be found anywhere within the body and if something seems wrong or different you should always check.

What is Leukemia?

Leukemia is a term for blood cancer- it makes it harder for the body's immune system to fight illnesses. It is more common to be found in adults older than 55 but can also be found in children younger than 15. Leukemia is usually thought to occur when certain blood cells acquire changes in their genetic material or DNA. A cell's DNA contain the instructions on what a cell needs to do. Typically, the DNA should tell the cells to grow at a set rate and die at a set time.

Signs of it

There may be different signs of it in children than adults. For example, some signs of it in adults may be: fever or chills, frequent tiredness or weakness, loosing weight without trying and easy bleeding and bruising but in children it could be: pale skin, feeling tired, weak or cold, dizziness and headaches. However, some may be the same in children and adults.

How can it be fought?

There are a number of ways it can be fought but the most common one is Chemotherapy. This is a drug treatment which contains chemicals to kill the Leukemia. Depending on the type you have is the amount you would receive. This medicine comes in a variety of forms it could be a pill or it could be an injected

MONKEY POX

Monkey pox is caused by monkeypox virus, a member of the orthopoxvirus genus in the family Poxviridae

Monkeypox is usually a self-limited disease with the symptoms lasting from 2 to 4 weeks. Servere cases can occur.

2-4 weeks later

The clinical presentation of monkeypox resembles that of smallpox, a related orthopoxvirus infection which was declared in 1980. Monkeypox is less contagious than smallpox and causes less #illness.

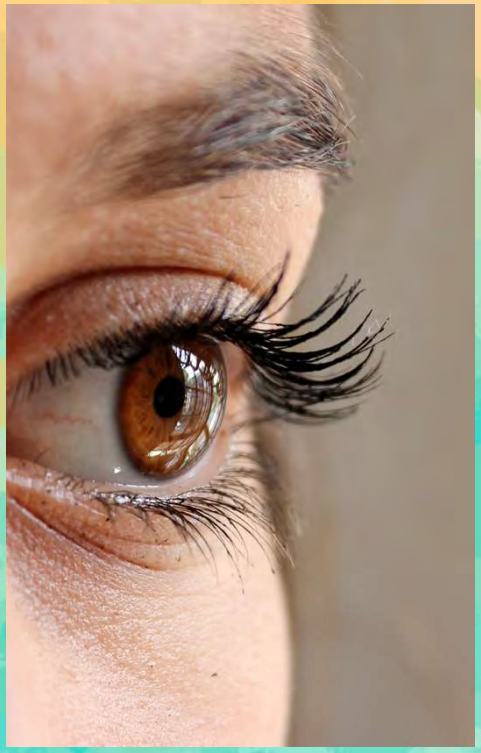
It's usually transmitted from animals

By Rosie M 7JCO

Monkeypox is transmitted from one person to another by close contact with lesions, body fluids, respiratory droplets and contaminated materials such as bleeding.

ACHROMATOPSIA

BY: T. J. 10GHN



Achromatopsia is part of the colour blindness spectrum, on the rarer side as well.
Like it is guessable, it is where all colour vision is gone, to describe, it would all be black and white, like on an old TV, minus the random lines.

There are two main ways you can be diagnosed with achromatopsia: you can be born with it, or it could develop. Being born with achromatopsia is not too common either, but it does happen. To develop achromatopsia, you would either likely be born with a form of mutation in the eyes, or a medical incident would occur, e.g. a stroke.

To define the colour blindness, it is a partial or total loss of colour vision. People who have total loss, can only really see black and white with shades of grey. Achromatopsia is a rare inherited condition affecting about one in 30,000 people. It affects the cone photoreceptors which are the specialist light-sensing cells responsible for colour vision and vision in bright light.
It can usually be an issue with colour coded items, like asking to get something out of a red drawer. It could look unusual for the person with the disorder as red is a typically dark colour, meaning it could be mixed up with drawers that may be green or blue. Things like this aren't too often nor too big of a struggle if things have labels for 'paper'.
Achromatopsia also involves other problems with vision, including an increased sensitivity to light and glare (photophobia), involuntary back-and-forth eye movements, and significantly reduced sharpness of vision (low visual acuity). Affected individuals can also have farsightedness.

Credits

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T.J.	Achromatopsia