

COULD DRAGONS EXIST?

WHAT REALLY HAPPENS AFTER WE DIE?

THE SCIENCE BEHIND THE ASIAN FLUSH

Editorial:

Well, it seems Issue 1 of ‘Teddies Talks Biology’ was a resounding success. I received extremely positive feedback from various members of staff, senior teachers and even members of the general public who came across it on our website. I would like to thank once more the few members of the Upper 6th who helped lay such fabulous foundations.

With the Upper 6th quite rightly turning their attention to the exam season, the Lower 6th have taken on the mantle of putting the magazine together.

For this issue, I thank all our valued contributors, but particular praise must go to Danielle Lim, Benjamin Wan and Huda Khalaf (L6th, Oakthorpe, Tilly’s and Oakthorpe) for their enthusiasm, perseverance and creativity in making this issue happen. Maddie Luke (L6th, Corfe) should also get a mention as chief proof-reader.

It is important to me that this is a pupil-led publication. They have come up with the design, written the articles, arranged the layout, done the proof-reading and put the magazine together all with very little support from myself.

If you wish to get involved in future issues please email me and I’ll add you to our mailing list (storeyr@stedwardsoxford.org). Involvement is great both for your wider biology education and for bulking out your UCAS form!

I hope you enjoy the read,

Mr Rick Storey

Head of Biology



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How addictive is the food you eat?

Valeria Orlova – L6th

One recent study revealed that an area of the brain related to addiction and reward, the nucleus accumbens, lights up when a person is shown calorie rich, fatty foods compared to healthy food. Another area of the brain associated with pleasant tastes and reward, the orbitofrontal cortex, is activated when we eat fatty foods.



In the early 2000s, a group of American psychiatrists studying obesity decided to test whether the hypothesis of food being potentially addictive can be experimentally proven. They carried out a series of studies in which rats were offered an option of sugary, fatty foods and healthier substitutes. Nicole Avena, a researcher said: "We found signs of tolerance, withdrawal, craving and measurable changes in neural chemicals such as dopamine and opioid release." –all the known signs of drug addiction were present, even tolerating "foot shock" (running over an electric grid) to get their fix.

As Avena mentioned, "additional studies have been conducted that validate these initial findings. And there's been some studies done in humans now that have really begun to characterize this."

So what is the most addictive food? Research in this topic is mostly concentrated on fatty and sugary foods, an addiction to which could explain why there are more than 1.4 billion overweight people in the world, 600 million of which are obese.

Fat and sugar are known to produce different responses in the brain's reward system: while rats who had been fed sugary diets and were suddenly switched back to a normal diet show signs of withdrawal, such as anxiety, shaking and changes in body temperature, rats on a fatty diet did not show such symptoms. However, we do have to keep in mind that that does not mean that fatty food is less addictive- cocaine addicts do not show withdrawal, unlike heroin addicts do.

The drug rimonabant, which reduces nicotine cravings in tobacco users, can reduce the desire for food- this is yet another piece of evidence that suggests food is addictive.

More work is needed to determine whether the brain's overeating networks are the same as its drug addiction pathways and, if so, whether addiction treatments can reduce the obesity epidemic.

Meanwhile we can test it ourselves: next time you are picking up your lunch, take a minute to think about what is making you take the certain foods- you or an addiction?



The Belgium Blue and a Little German Baby

Max Thompson - L6th

The question that needs to be asked is: what do a Belgium Blue (a cow) and a German baby have in common? It's easy to name the simple things such as blood and organs but that's very boring. What's interesting is the genetic mutation they share.

Around the turn of the 21st century a baby was born in Berlin. This baby was described to have "chiselled biceps" and "tight skin" around his legs and calves. This was not baby fat but instead the baby was twice as strong as a normal baby. He was born completely healthy, just with this abnormal strength. This strength continued and by age four, it was reported he could hold 3Kg dumbbells horizontally at arm's length. However, it wasn't as if this strength came from nowhere. His mother was a sprinter and both his father and brother were strong. Yet the interesting part is his grandad, who was a construction worker. This man is claimed to have been able to lift 150Kg curb stones from truck beds with his bare hands. This strength is known as double muscle, which is due to a genetic mutation in chromosome 2 on a gene named GDF-8. GDF-8 is responsible for the production of a protein called myostatin which stops muscle growth. This faulty

gene means that myostatin cannot be synthesised in the German super baby resulting in uncontrollable muscle growth.

In a Belgium Blue cow this is the same situation, double muscle. Belgium Blue were bred after the Second World War as a source of meat. They bred a Friesian Dairy cow and a Durham Shorthorn which



resulted in a Belgium Blue. As shown in the photo below, the cow has extremely great amounts of muscle as they have no stop sign for muscle growth. Understanding this mutation could potentially help people with muscle diseases such as mitochondrial disease, which is when the mitochondria in cells do not function properly. This means muscles can't operate correctly. Despite the beneficial side effect of this faulty gene, there is the issue of people trying to use it as a form of muscle enhancement in elite sports. Dr Se-Jin Lee, who has been researching this mutation, has been contacted by elite athletes wishing to abuse this technology.

A final interesting point is that they have done work with mice in which quadruple muscle was created. Mice were injected with a transgene that produces the muscle building insulin-like growth factor, IGF-1, and they had no gene for myostatin. The result was quadruple muscle (the incredible hulk of mice).



Medical Biotechnology - Here to Save Humanity?

Max Ogdon - 5th Form

Medical biotechnology is one of the most revolutionary and effective ways to treat and prevent diseases. It is a new way to defeat fatal diseases through the use of genetic engineering and other innovative discoveries in the past half century. Medical biotechnology is used to treat diseases by using living cells to produce diagnostic products which in turn help prevent and treat illnesses. This form of biotechnology has only been around for a short time, but already we are edging ever closer as a species to curing more and more bloodcurdling diseases. Yet as this new form of biotechnology continues to develop rapidly, what could it potentially mean for the future of the human race?

Biotechnology is simply the use of living cells in order to research and develop pharmaceutical products which could cure or prevent certain diseases which currently affect humans. The very first step on the pathway of biotechnology was whereby humans managed to genetically engineer bacteria to produce human insulin, therefore being a very revolutionary innovation as it led to diabetes sufferers being able to access more efficient insulin in terms of reducing blood glucose levels. Since before this innovation in the field of genetic engineering, diabetics would have had to make do with insulin produced from other mammals, which didn't work in the same way as human insulin did. The way genetic engineers achieved this was by transferring an INS gene from human DNA and transferring it to the DNA of a bacterium. This bacterium would now have the gene for coding human insulin. Therefore this essentially means you do not require humans to produce human insulin. This was the very first major discovery in the field of biotechnology.

Cancer- a devastating illness. However biotechnology has brought us a step closer to curing it. The use of monoclonal antibodies is a method that has been developed to target any form of disease, causing cells that have affected the human body- in this case cancerous cells. Monoclonal antibodies is a method whereby clones of the original parent cell are produced. This is done through genetic engi-

neering where human antibody genes are transferred to the DNA of a mouse; this allows the mouse to produce the protein to make cells which in turn produce human antibodies. Then when these cells have been genetically manufactured within the mouse, they are obtained and fused with cancerous cells within a cancer sufferer and one can cause these new clone cells to produce antibodies to specifically target the antigens on the cancerous cells. Therefore through cloning parent cells, this form of biotechnology is also incredibly revolutionary and useful in our world today as it has allowed us to cure cancers such as leukaemia more easily and swiftly than ever before.



Biotechnology has multiple beneficial uses which is allowing mankind to cure more and more life threatening diseases, two of which are diabetes and certain forms of cancer. Diabetics are now able to access human insulin through genetically engineering bacteria to produce the insulin required. Furthermore, forms of cancer, such as leukaemia, can now be more easily cured through cloning parent cells. These cells can then be 'programmed' to tar-

get only cancerous cells in this instance. This article has looked at only a few ways biotechnology can be useful medically. However biotechnology is also being used in stem cell research, whereby the stem cells have the ability to transform into practically any cell. They are currently being used for repairing heart tissue and bone marrow. It is also being used in tissue engineering, where artificial organs such as hearts are being grown in laboratories using living cells and tissue. Therefore, with the field of biotechnology developing in the area of medicine, what does it mean for the future of us and the future of the medical industry? Could it possibly mean a definite cure for all cancers or if one of our organs fails we simply replace it with another one? Medical biotechnology still has a lot to offer us.

RNA-Silencing Biotechnology

Cerelia Caesar - L6th

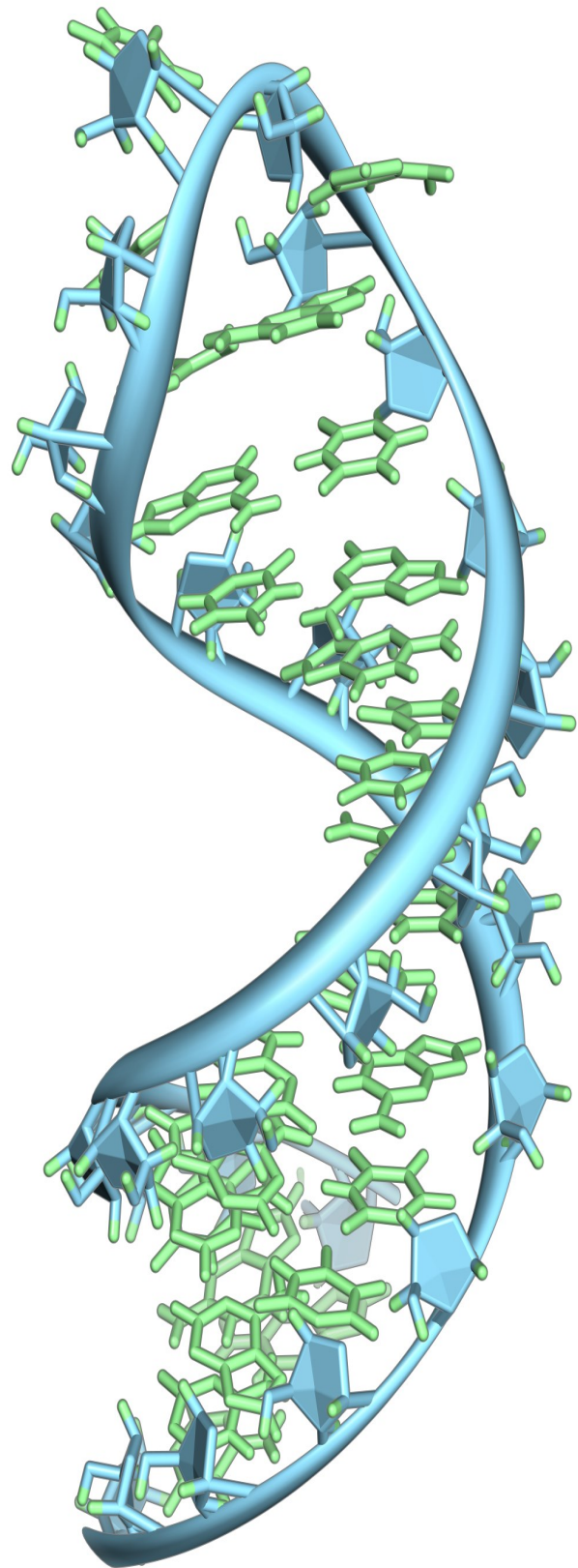
In the past century alone we have made vast technological developments, which have been essential in promoting new discoveries in our biological world. *RNA-Silencing* biotechnology is involved in many fields including biomedicine and the development of better and more sustainable crops.

RNA-silencing is a process which involves suppressing protein production or affecting chromosome function by giving RNA an abnormal double-stranded structure. The sequence of bases in the double-stranded RNA determines the specificity of RNA-silencing.

In the engineering of plants and crops, RNA-silencing is involved with protecting plants against viruses, to create stronger plants able to survive harsher conditions. These short silencing-RNAs are known as *short interfering (si)RNAs*. This technology can even go further to the very core of the plants; engineering the RNA-silencing *into* them. This consists of using transgenes, which are created to produce double-stranded RNAs. In some experimental procedures, this method has been used to make some plants more disease resistant, which involves targeting *viral RNAs*. Viruses use viral RNA to replicate within a plant, so no viral proteins mean no replication of the virus. This can be applied to the improvement of the nutritional quality of seed, fruit or tubers by silencing the genes responsible for poor quality.

In biomedicine, the double stranded RNAs have been introduced into cells in order to silence RNAs responsible for genetic disease and cancer. This has only been done under experimental conditions, so no mass scale practice or publication of this method has been undertaken yet.

Global warming is changing our planet's climate at an alarming rate. Countries with economies based on agriculture and farming, which are primarily developing countries, are faced with challenges as the climate changes. Severe droughts and floods may destroy crops, which would damage their economy and the country's welfare. For this reason, it is vital for scientists to develop plants that are better adapted to survive harsher conditions, with respect to providing food for the ever-growing population.



Introduction

The dragon is a mystical creature, which can be commonly found in different cultures' mythology, modern fantasy books or films, and in other aspects of modern media. They are incredible creatures in fiction. The question is: could they exist theoretically?

Base structure

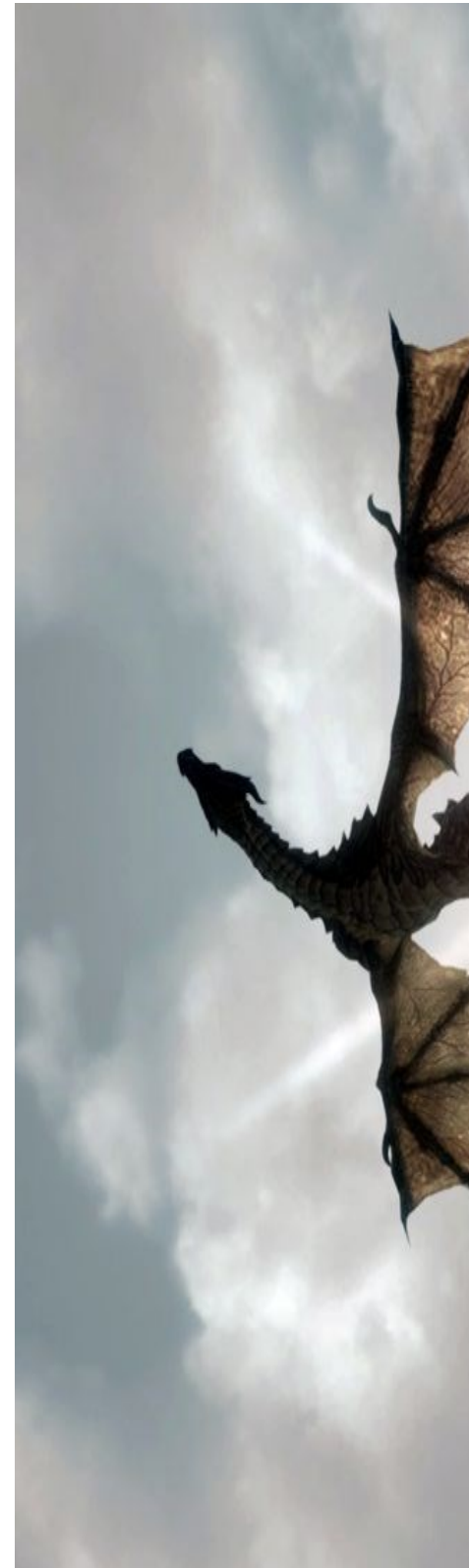
Most people would agree, that the dragon is essentially a reptile and has most of their basic characteristics, such as scales. Scales and horns or spikes, if present, are made of a densely packed cells of protein called keratin, which is developed from epidermal cells. In some existing reptilian species the scales are additionally reinforced by bone plates, which should be the case for dragons as well.

The main characteristic which separates dragons from reptiles is the number of limbs. Dragons have six – four walking ones and a pair of wings. The mutation producing an additional pair of limbs is possible. This mutation explains insects having six legs. There is nothing which would prevent it's development in reptiles if it would increase the chances of survival.



Digestion

Dragons are generally described as omnivores, which means that they have two different types of teeth - incisors and canines for meat eating and molars for plant material. At times, dragons are also described to eat whole pieces of meat with bones, which cannot be digested naturally. However there is a way out, which is not uncommon for many reptile species and can be seen in birds or mammals as well. These animals ingest rocks, which are then situated in the second chamber of the stomach and they help to physically divide food into smaller digestible parts – such as whole nuts in the case of birds or pieces of bone taken in by crocodiles or dragons.



ology: Dragons

a –5th Form

Fire Breath

If the digestion process in dragons happens the same way as in birds or reptiles, then not all of the food will be absorbed. In most of the animal species, unabsorbed food is left for bacteria in the intestines to feed on. Those bacteria will then produce intestinal gases through the process of fermentation, mainly in form of hydrogen and methane, which are highly flammable when combined with oxygen. Dragons can potentially store these gases to breathe them out later. Ingested rocks, if metal rich, would leave a residue of minerals on dragons' teeth, which would allow a dragon to cause a spark by teeth grinding together and creating friction, igniting the released flammable gases.



Flight

The flying capability of dragons relates them closely to the pterodactyls – probably the most well-known flying reptile. However, pterodactyls had very weak legs and their bodies were almost flat – they only used their wings for movement and not their limbs. There is also a significant weight to area ratio difference – as a dragon has scales and is supposed to have heavy bones, which can potentially withstand a knight's weapons, therefore being generally heavy. Pterodactyls, as well as flying birds and other creatures, have very light, sometimes partly hollow and, therefore, fragile bones specifically to reduce weight. A bat's bone, for example, is so light and flexible, it can be tied in a knot without breaking. This means, sadly, a dragon, as it is presented in books or films, would not be able to fly. A huge scaly, fire breathing and human-eating reptile is still an impressively intimidating creature without the ability to fly.

The Blue-footed Booby - *Sula nebouxii*

Danielle Lim –L6th

What are they?

The blue-footed booby is a type of bird which lives off the western coast of Central and South America. On the Galapagos Islands their population includes about half of all breeding pairs of blue footed boobies.

Blue-foots tend to nest on land at night and when day breaks they take to the air in search of sea-food. At times it can be seen that they fish in groups. These animals have incredible physical adaptations, which allow them to fold back their long wings around their streamlined bodies and plunge into the water from as high as 80 feet. Furthermore, they can also dive from a sitting position of the water's surface.

Feeding

They mainly feed on fish such as flying fish, sardines, anchovies and mackerel. Occasionally they may also feed on squid. They tend to dive from heights between 10-30m and can hit the water at speeds of up to 96km/hr. They can hunt alone, in pairs or in groups and tend to consume their catch while still underwater.

How did they get their name?

It is believed that they obtained their name from the Spanish Word 'bobo' which means 'stupid'. This is how early European colonists would have seen these clumsy birds as this is how they appear to be on land.

Blue-footed boobies breed throughout the year and the males use an elaborate courtship display to attract females. The display consists of him showing off his blue feet by doing a high stepping walk and stamping his feet.

Around 1-3 eggs are laid in a shallow depression in the ground. The parents take turns incubating the egg and do so by using the warmth of their feet to keep the eggs warm.

After 41-45 days the eggs will hatch and the chicks will sit by the parents' feet to stay warm. The chicks are fed regurgitated fish and it is the male that provides the food. However, when food is scarce only the largest chick will be fed.



Breeding

Facts:

Type: Bird

Diet: Carnivore

Average Life

Span: 17 years

Size: 32-34 inches
wingspan, nearly
5ft.

Weight: 3.25 lbs

The difference between a male and female is that the females are slightly larger and have star shaped pupils.

Animal Testing

Danielle Lim and Huda Khalaf—L6th

Animal testing is any scientific experiment or test in which a live animal is forced to undergo certain procedures in order to help find cures to certain diseases which are present in both humans and the animal being tested. The animal which tends to be used is the mouse because we share 95% of our DNA with them. Overall, they have a very high reproductive rate, so there are many we can use and, in general, they are small so they are much easier to store than larger mammals. Here we will discuss the advantages and disadvantages to animal testing.

For:

In the last decade animal testing has played a vital role in nearly every medical breakthrough, therefore proving the need for animal testing in the lives of every single person on earth.

Thanks to animal testing the overall cancer survival rate has increased. For example Herceptin, which is a humanised mouse protein, has helped to increase the survival rate of those with breast cancer. In the UK there are 5.4 million people who suffer from asthma. With the help of animal research, we have been able to develop asthma inhalers to become more efficient. Asthma in the UK is still a huge problem with 2,000 people a year dying of asthma. In addition, animal research has helped develop vaccines for Polio, TB, Meningitis and more recently HPV.

One of the biggest successes of animal testing is that smallpox has been completely eradicated from the Earth.

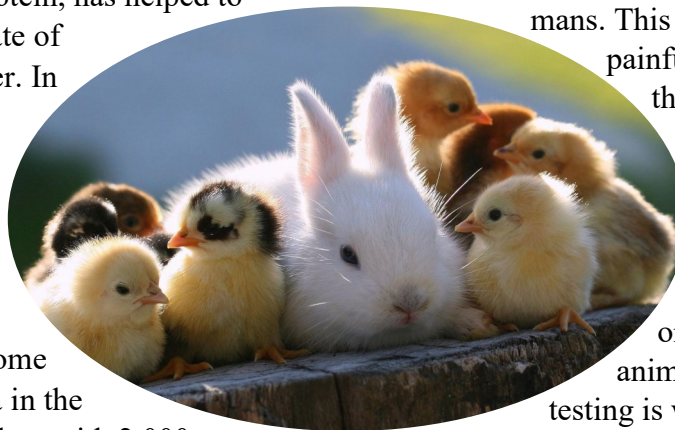
For those that believe that we are harming too many animals through animal testing: dogs, cats and primates account for only 0.2% of the animals being tested on in the UK. Furthermore the UK has the highest standards of laboratory animal welfare in the world and animal testing can only be carried out when there is not a suitable non-animal alternative.

Against:

One of the main reasons as to why animal testing should be considered unacceptable is its ethical implications. It is unfair and cruel to sentence millions of animals to lives in cages and fear, just to intentionally cause them pain and harm.

Furthermore, the food and drug administration reports that 92 out of every 100 tests which are reported to be a success on animals, fails on humans. This means that the relentless

painful tests we put animals through are mostly unhelpful and the products developed may actually be damaging for humans because harmful foods and drugs may be considered safe for consumption on the basis of testing done on animals. This links to how animal testing is wasteful because of how animals and humans react differently to the consumption of certain substances. Scientists have managed to cure cancer on mice but the treatments have never been successful when applied to humans. To put animals through the distress of animal testing is unnecessary as modern scientists have developed more humane and effective ways to conduct research which does not involve animal testing, such as human based micro-dosing, human patient simulators and sophisticated computer modelling.



Unravelling Alzheimer's

Huda Khalaf - L6th

According to the Office for National Statistics, the percentage of senior citizens in the British population is expected to grow by 6.3% in the coming 23 years. The incidence of Alzheimer's disease in the aging population is predicted to increase proportionally. Therefore, it is important that we, as a society, are aware of this disease and all its life-threatening implications.

What is Alzheimer's disease?

Alzheimer's disease is the most common type of dementia reported to date. The disease is characterised as a type of neurodegeneration. This implies that, over time, the affected brain systems and processes deteriorate. When this happens, symptoms characteristic of this disease develop. An example of a symptom is loss of memory. Besides that, the loss of one's ability to carry out simple problem solving tasks and speech impairment are hallmark symptoms of Alzheimer's disease.

Among those affected are people over the age of 65. Interestingly, this disease appears to affect the female population with a higher frequency than males but only by a small margin. Besides that, an estimate of 5% of Alzheimer's cases affect people aged 40 to 65.

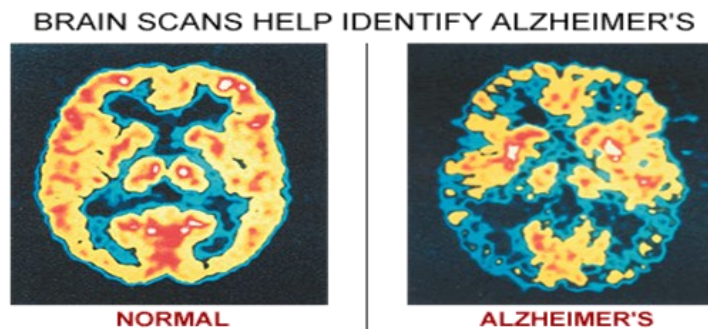
What is Tauopathy?

To date, the exact cause of Alzheimer's disease remains unclear. But tauopathy is one of the more widely accepted theories in understanding the disease's mechanism. Tauopathy centers around the loss of the protein, Tau, in neurons. In normal instances this protein is located on the neurons in the brain. It works to stabilise the part of the neuron that is important in the transport of proteins across the brain. In Alzheimer's disease, an extra phosphate molecule is added to the Tau. Now, the protein, Tau, is heavy and bulky. This leads to the protein effectively falling of the neuron. Therefore, the transportive neuronal structure is lost and the protein the neuron was previously carrying across the brain is lost forever. Furthermore, the fallen protein appears to form tangles in the brain that additionally damage neuronal transport.

What can we do?

At present, there is no cure to Alzheimer's disease. There are, however, possible ways to treat some symptoms of this disease with medication. Moreover, people with Alzheimer's work with health professionals to develop care plans. The care plans offer support to those with Alzheimer's and allow them to remain independent for as long as possible in daily life. Additionally, health professionals assist people with Alzheimer's in identifying any necessary changes at home for easier living.

A piece of advice for those caring for a person with dementia is to speak slightly slower and in simple



sentences to those experiencing verbal communication difficulties. Beyond that, breakdown tasks into smaller more manageable steps. And lastly, be patient and compassionate. No matter the difficulties

you face as a carer, those with Alzheimer's disease carry a heavier burden. Therefore, they deserve our understanding.

In conclusion, Alzheimer's disease remains one of the leading causes of death in the UK. The disease remains incurable but every day, the scientific community makes great strides in furthering our understanding of dementia. And with this knowledge, we move ever closer to identifying a cure for Alzheimer's disease.

Does Food Effect the Chances of Developing Alzheimer's Disease?

Lacinia Caesar - L6th

Alzheimer's disease is the progressive damaging of neuronal networks. This is fatal as it is incurable, since nerve cells cannot be revived. Billions and billions of dollars are being spent on research to find the perhaps unreachable cure for this disease. Unfortunately, not enough of this research is focusing on food's effect on the Alzheimer's disease.



Enough research has now been accumulated to discover that atherosclerotic arteries are associated with Alzheimer's disease. Atherosclerosis is a serious condition of which the arteries are clogged with fatty substances, known as plaques or atheroma; they harden and reduce the arteries, thus restricting blood flow and oxygen to vital organs (in this case the brain). Alzheimer's patients will have significantly higher arterial blockage in areas leading up to the memory centre of the brain. Therefore it has been found that people with higher amounts of arterial blockage will lose more of their brain functions faster and increase their chances of developing full-blown Alzheimer's.

Alzheimer's is something that takes time to develop and therefore one's diet plays a big role in its development. Since Alzheimer's is primarily caused by having high cholesterol, it is proven that a diet with a lower ratio of saturated to unsaturated fats can slow or decrease chances of Alzheimer's. Studies have further shown that people with a higher saturated fat intake will have a higher correlation of cognition and memory. This has lead scientists to believe a diet based primarily on fruits and vegetables will essentially 'help' the brain.

In 2012, Harvard University collected data from Nurses' Health Study; this data showed the diets and

health of thousands of women starting from 1980. The cognitive decline of women was slowed down by as much as two and a half years if they consumed berries every week; namely blueberries and strawberries. So, blueberries are good for your brain! However, it is not berries alone that help your memory and brain, but also fruit and vegetable juices. A study made over 8 years with two thousand people proved that regular consumption of fruit and vegetable juices lowered the risk of developing Alzheimer's disease by 76%!

The secret ingredient in these foods that helps to fight against aging in the brain is the powerful antioxidant called polyphenols. It is not only antioxidant rich, but also protects the nerve cells in our brains by preventing the formation of plaques and tangles (which are the causes of Alzheimer's disease).

As we grow older our brains grow older; yet, we have the power to control the rate that our brains age and minimize our chances of developing Alzheimer's disease. Simply by what we put on our plate - so pile up on the fruit and vegetables! - A diet primarily made up of plant based food will help lower cholesterol by lowering your intake of saturated and trans-fat (which comes from junk food and animal products). A plant based diet will also result in a higher consumption of fruits and vegetables every day which can slow the brain's aging by up to two years.

Your diet has an impact on the development of Alzheimer's disease, so make sure to reduce intake of foods that cause high cholesterol, such as cheese and eggs; or foods high in trans-fat; such as fried foods and cookies.



What Happens After We Die?

Chase Flynn - L6th

In modern medicine, death is classified as the time in which the heart is no longer beating, and from that moment onwards, numerous changes begin to take place inside the body. The manner in which the person has died may be relevant to the exact processes that take place after death; deaths wherein the corpse is deprived of oxygen will lead to vastly different processes occurring than ones where the corpse is preserved, however in this article, I will mainly be discussing the processes that occur in a body under normal conditions.

Firstly, at the moment of death, and for some time afterwards, many of the body's cells live on, albeit for not very long. Cells in the brain and other organs may live on from anywhere between 3 and 15 minutes, dying once oxygen is depleted and lactic acid produced thereafter lowers the pH of the cell and denatures most of the enzymes. Some cells such as skin or cornea cells will live on for longer, as they have access to oxygen directly from the atmosphere, however they will eventually die due to a lack of energy.

The next occurrence after death is the rapid cooling of the body as respiration no longer takes place. The body will decrease in temperature until it is the same as the surroundings. Since the heart has stopped beating, the blood will settle in the vessels and tissues closest to the ground, and then thicken and coagulate there, leaving an observable purple-red hue to the skin in a process called post-mortem lividity.

6-12 hours after death, a process called rigor mortis begins. This is when all the muscles in the body stiffen for a period of up to 72 hours, it usually begins within 6 hours after death, however can take as long as 12 hours to fully set in. It is the result of muscle cells becoming more permeable to calcium ions as there is less ATP to keep the ions out. This in turn causes the fibres to ratchet tighter and tighter until they are fully contracted. The muscle cells require ATP to release the fibres, however most of it is used in the process of contracting, so the muscles will remain tense until the muscles decompose enough that the fibres are no longer attached.

24-48 hours after death, the first stages of decomposition will become apparent. Swelling of the abdomen, gas pockets under the skin, splitting of skin due to pressure, separation of nails and hair from skin, sagging of skin and sinking of eyes are all processes that will take place within 48 hours. The bloating of the abdomen is caused by bacteria in the small intestine that previously assisted with digestion of food beginning to break down the host's cells. These cells respire, releasing carbon dioxide gas which inflates the abdominal cavity as there is nowhere for the gas to go.

48+ hours after death, insects and other small animals or scavengers will break down the body further. Most commonly, flies will lay their eggs in the corpse, which will then hatch to become maggots, consuming much of the body in a process called skeletisation, whereupon everything in the body is consumed except for the bones, leaving behind an undisturbed complete bone structure of a human.



The Asian Flush/Glow

Benjamin Wan - L6th

Approximately 80% of the Asian population suffer from 'The Asian flush/glow'. The Asian flush does not only occur in Asians but is most prominent in Asians or more specifically Eastern Asians. It is also known as Alcohol Flush syndrome and occurs in people of other ethnicities who cannot metabolise alcohol efficiently. The syndrome is caused by an enzyme deficiency due to a genetic mutation that has been passed down from generation to generation. The symptoms include facial blushing, nausea, fever or increased body temperature, headache, increased heart rate and general feeling of physical discomfort. This is caused by the body not being able to process alcohol efficiently and therefore there is a build-up of acetaldehyde, a carcinogen.

How is Alcohol metabolised?



First we must understand how alcohol is metabolised. Alcohol is broken down in two steps. Alcohol is broken down by the enzyme alcohol dehydrogenase. The alcohol is broken down to acetaldehyde. After this the acetaldehyde is broken down further to acetate by aldehyde dehydrogenase, and eventually the acetate is broken down into carbon dioxide and water.

What causes Asian Flush/Glow?

The cause of the Asian flush is due to a genetic change that affects alcohol metabolism. What occurs in Asians is that they normally have a lot of alcohol dehydrogenase and therefore the alcohol is broken down very quickly to acetaldehyde. However, the

genetic change also reduces how much aldehyde dehydrogenase enzyme the person has and therefore there is a rapid build-up of acetaldehyde but not enough enzymes to break-down the carcinogen into harmless products. This build-up of acetaldehyde causes dilation of the blood vessels in the face but does also occur over the rest of the body as well. The increased heart rate is a result of the body trying to metabolise the enzyme quickly as acetaldehyde is a carcinogen.

Dangers of drinking alcohol with the Asian Flush

As said earlier the Asian flush is due to a build-up of acetaldehyde, which is an animal carcinogen. Therefore Asians who drink a lot of alcohol are putting themselves at more of a risk of oesophageal and/or stomach cancer as well increased risk of peptic ulcers and gastrointestinal disease.

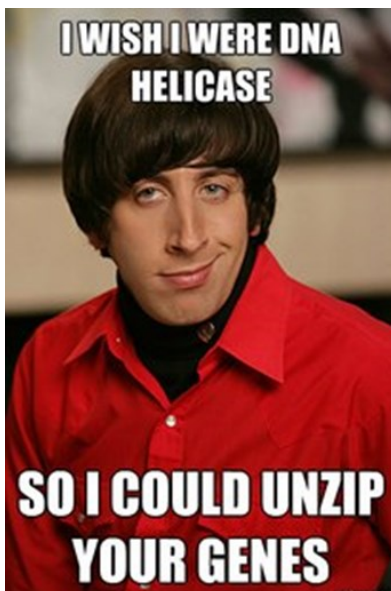
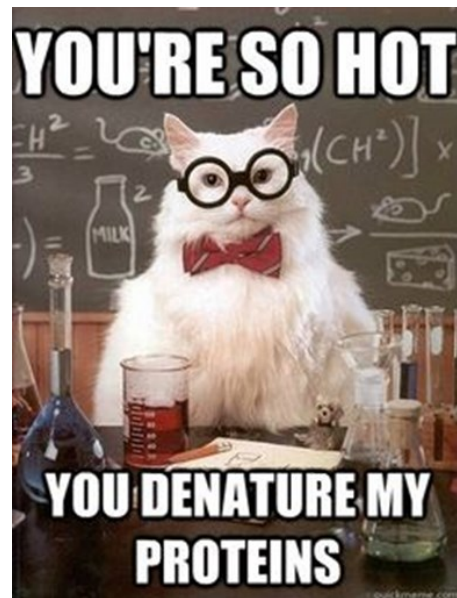
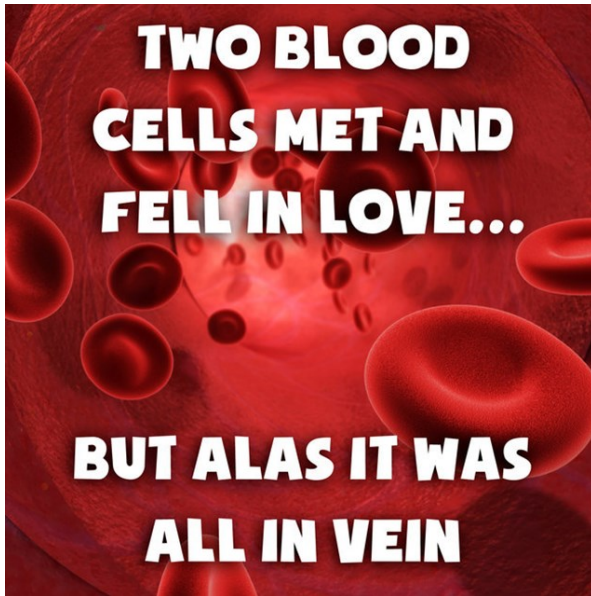
Benefits of the flush and remedies

The only real benefit of having the Asian flush is that often they are put off drinking a lot of alcohol or alcohol entirely as some think it is too much to put up with and often due the flush they don't get the buzz that comes along with alcohol. People have discovered certain remedies that have worked. These include anti-heartburn tablets such as Peptic AC and antihistamines such as Zantac. People have also claimed pills called 'Before Elixir' have worked as well. 'Before Elixir' consists of vitamins, amino acids and plant extracts.



Happy Valentine's Day!

from all at Teddies Talks Biology.



 **TEDDIES** talks **BIOLOGY**