ISSUE 3 | DECEMBER 2017 | FRENCH INTERNATIONAL SCHOOL

the med

In this issue:

COMBATING ANTIBIOTIC RESISTANCE

How bacteria become resistant, the human practices which increase this resistance, and how to combat it

FUTURE OF ANTIBIOTICS

An investigation in antibotics - a type of antimicrobial drug used in the treatment and prevention of bacterial infections.

CURE FOR HUNTINGTON'S DISEASE

A team at UCL has recently had a breakthrough in finding a cure for Huntington's disease, which affects around one in every 10,000 people.

All about the future of medicine!


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EDITOR'S NOTE

Dear Medical Journal Readers,

Welcome to our December edition of the FIS Medical Journal with the theme of 'Technology and The Future', thanks for checking us out!

As a united team of Year 12 students, the FIS Medical Journal's main aims are to provide a light-hearted magazine-style medical journal for all FIS secondary students, to create opportunities for research and collaboration within the FIS community, to raise awareness of medical issues in the FIS community, to spark inspiration and interest in younger students as well as to provide Medical School guidance and advice.

Medicine is constantly changing with the help of advancements in technology. I still recall the time when Mr Clayton talked about a renowned 19th century Scottish surgeon named Robert Liston who valued speed when operating on his patients. One of his most famous operations ended up with a 300% mortality rate and all that was due to poor sanitation and infection. It's incredible how the invention of anesthesia and antiseptics have greatly improved patient operations.

This brings us to our third issue of the FIS Medical Journal, 'The Future'. In this issue, we have our guest writer who is an FIS parent, Ms Tien Nguyen, who has put a lot of time and effort into writing a fantastic preface to this issue. Be sure to check it out! Our featured articles of this issue are a range of breakthroughs in the world of medicine and also features a new Year 11 contributor, Ethan Bensadoun. In addition, our FIS Community Survey in this issue features the involvement of Year 6 students, a first in collaborating with the Primary International Stream and I am hoping for more collaboration in the future. Finally, our University Guidance article features why most medical school applications are rejected. It is definitely a good read for some tips and advice in the future.

Another big thank you to FIS for its continued support for the series.

Now please dig in and enjoy!

Hadrian Wong
Editor-in-Chief

PREFACE

The Future of Medicine

BY TIEN NGUYEN

'When I think of the Future of Medicine, images of Star Trek-esque science-fiction medical gadgets come to mind.

Treatments

The Future of Medicine resembles modern science fiction indeed. We can expect real time diagnostic devices, genomics: mapping of the human genes to help with customized therapy and dosage, crowd sourcing medical information with the help of the ever growing social media, robot assistants, implanted wearables discreetly transmitting medical information to health care providers, 3D-printed organs on demand, Artificial Intelligence assistants who can help doctors read research papers and suggest the most fitting therapies…… The list is endless.

As we are living longer due to medical advances, our organs tend to fail more – it's part of the natural aging process. And there are simply not enough donor organs to meet this demand. Every thirty seconds, a patient dies from a disease which could be treated with organ or tissue replacements.

in a 2011 TED talk, Dr Anthony Atala showed us an example of his team's work in regenerative medicine: 3-D printing a human kidney live on stage with live cells as ink. It was mesmerizing.

His young patient, Luke Massella had received a lab-engineered bladder in 2001. This transplant had enabled this young man to live a largely normal life and excelled in sports, a notion simply impossible before the transplant.

Engineered tissues organs had been created and implanted in the past, by hands. The use of 3D-printers will allow the process to be automated and scaled up, reaching many more patients.

Prevention

While medical science can work miracles, good doctors will tell you that there is little which can be done to treat serious diseases without compromising your quality of life. The key lies in prevention. **Prevention is what we should focus on in our future of medicine.**

The leading cause of deaths in common in Hong Kong and the US are cancer, heart diseases and stroke. They account for roughly 50% of all mortality.

Leading Causes of Deaths ** (%)

	Hong Kong	USA
Cancer	30.6	22.5
Pneumonia	17.1	2.1
Heart disease	13.2	23.4
Stroke	7.0	5.0

** 2015 statistics

Yet most of these costly diseases are preventable, according to the US Centers for Disease Control and Prevention.

Did I mention these diseases are expensive to treat? In the US, an estimated HK$77,500 per capita per annum is spent on healthcare. In HK, the figure is HK$8,700.

In the case for the opposing team: after adopting the western diet, Asia went from having one of the lowest rates of chronic diseases in the world to amongst the highest in just one generation.
The irony is that the traditional Asian diet can reverse heart disease, cancer, obesity, diabetes and other chronic diseases.

So can sweeping lifestyle changes be done?
The North Karelia study in Finland did just that. In the twenty years period to 1992, its people reduced their heart disease mortality rate by a remarkable 73% (and 44% of all cancers). How did they do it? By convincing its people to reduce their cigarette, dairy, fat, salt consumption and increase their intake of fruits and vegetables. Although the men were reluctant to change their diet at first, it had the support of the women who control the food preparations. Statistics showed that their lifespan were prolonged by 7 years. Yes, it can be done.

Lifestyle changes which will help us live healthier: Diet: more plant based, less animal products, less sugar, Stress management, Exercise, Smoking cessation, Support group, and Supplements. Sleep is a power cleanse for the brain and our whole system. Yet we are not getting enough of it.
The Blue Zone Project whose goals are living a long life with less chronic disease has very useful tips and interesting information on its website.

Patients in the Centre

So what is the most important development in the Future of Medicine?
It is You and Me.
It will be with the Patients in the Centre.
We will be managing our own health.

Patients' empowerment is not new, and, it is growing. Who would have predicted the #MeToo movement would affect such sweeping changes in attitudes?

The availability of reliable information had helped engaged and empowered patients, e-patients and advocates. Caregivers had ignored the most important stakeholders for too long. More patients and advocates are scrupulously researching their conditions with the help of digital tools, share experiences with other patients, communicate effectively with their doctors and navigate the wild jungle of healthcare.

Many patients and advocates are qualified, determined, well informed and resourceful. We are the driving force of developments to improve quality of life. Healthcare providers, drug companies, government officials and families are patients too.

Not convinced? The late 1980s, HIV AIDS activists provided an excellent case study of patient empowerment. Faced with certain deaths with no effective treatments, activists organized themselves: providing information to the media to be on side, did research in health science and mobilizing the community to protest including guerilla tactics. They revolutionized the way drugs are researched to the way doctors treated patients, how drug companies did clinical trials and shorten the drug approval process. They played a key role in catalyzing development of front line drugs and saw a breakthrough in 1996: a life saving drug, keeping 16 million HIV positive people alive with the promise of a lifespan of an ordinary life.

Breast cancer treatments are also changing with research and patient empowerment. It has been massively over-treated, especially with cases of DCIS Stage 0, these malignant cells had not and may not spread into the lymph node or blood stream. Early detection and aggressive treatment plans of surgery, radiation and chemotherapy, although designed to save lives, had not improved the death rate over the past 15 years. Patients were exposed to needless toxicity.
More women, armed with these research, have been opting to monitor their DCIS instead of the standard breast cancer treatment.

If 50% of diseases are preventable, then we should demand more research into disease prevention, insurance companies to cover it, policy makers to facilitate it - much like the AIDS activists leading the fight 30 years ago. After all, it will save money and sufferings for all parties involved.

Our instincts and practices, when faced with serious diseases, have been to outsource health decisions to our doctors. Data shows that patients' satisfaction and outcomes soar when doctors involve patients in designing their own health care. Change in medicine comes from patients and advocates.
Patients and health care providers will be working together as a team.

That, will be, the Future of Medicine.

THE TEAM

BEHIND THE MED

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DECEMBER 2017

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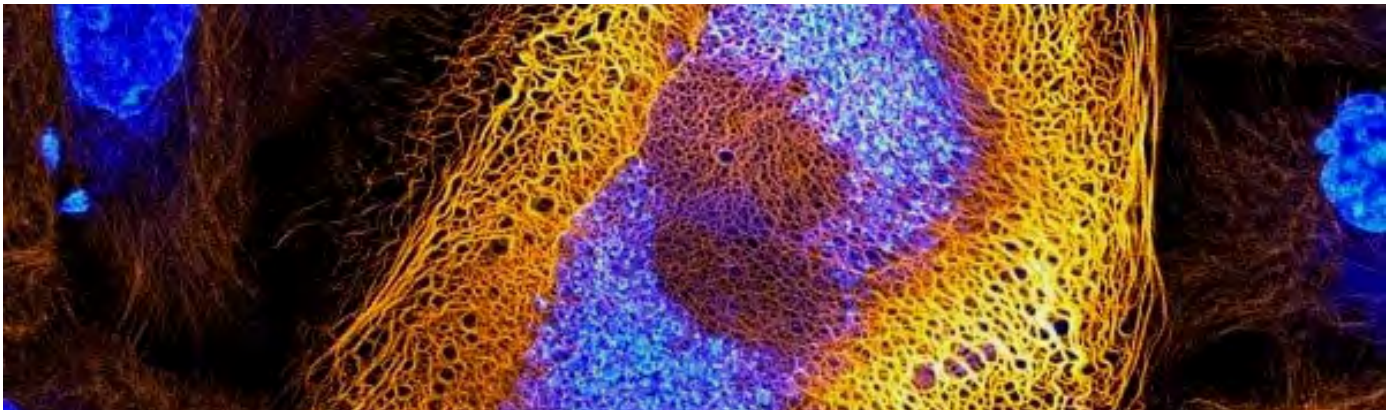

ON THE COVER
Computer-envisioned model of future medicine technology


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WHAT'S THE DEAL WITH

TECHNOLOGY IN MEDICINE

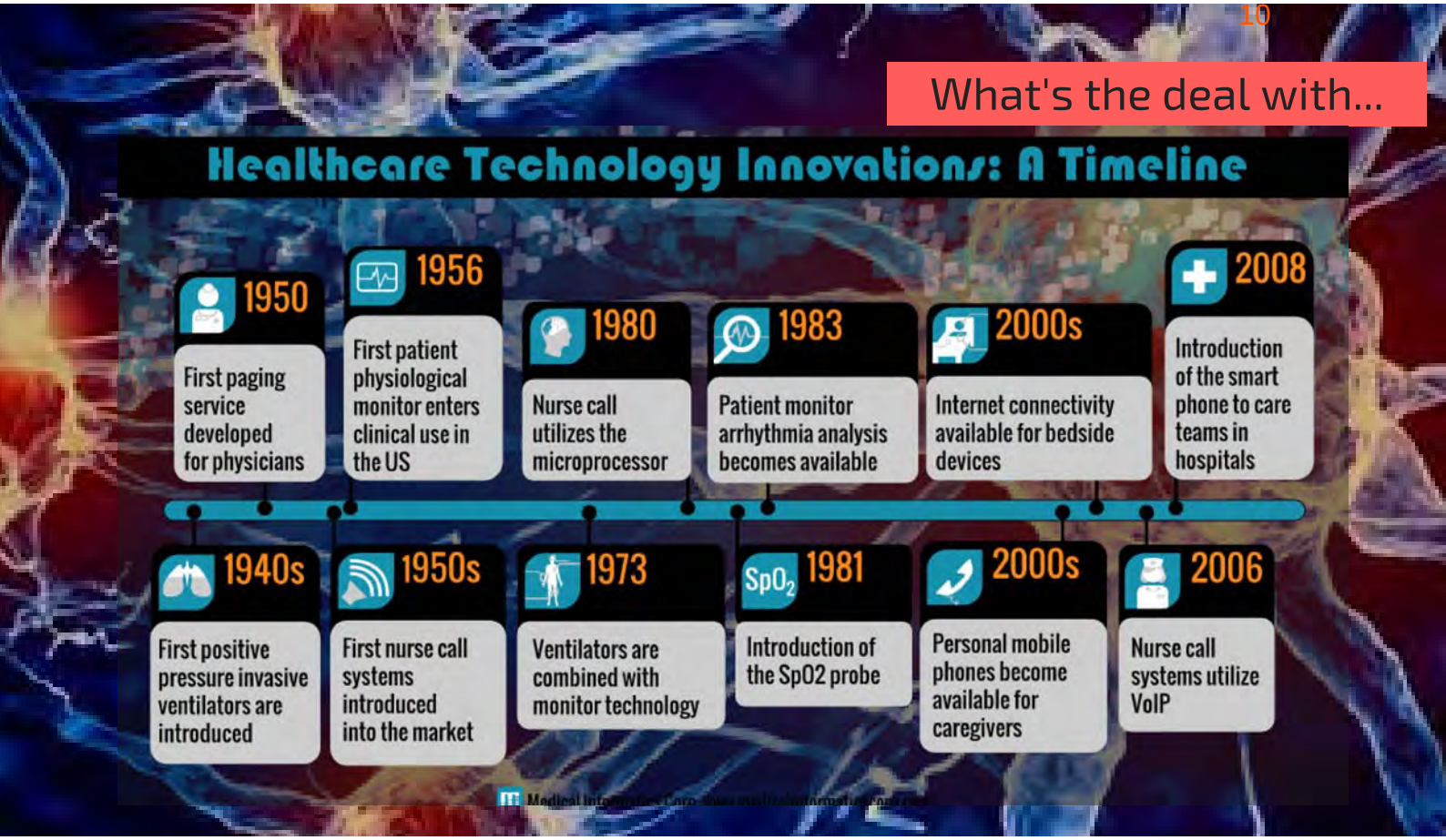
"As a teenager, it is important to have a good balance between workload and freetime."

By Esme Seaver &
Elena Meganck

Technology is defined as the application of scientific knowledge for practical purposes. For medicine, this means the creation of medical devices, vaccines, procedures and systems in general to improve healthcare. Many of now common practices were once the product of revolutionary advances in technology.

Past medical breakthroughs

X-rays revolutionised the way doctors diagnosed diseases. Before that, invasive exploratory surgery was needed. (infection etc.) However, x-rays also gives insight into the risks of technology as unprotected exposure to the radiation caused many patients and radiologists to
develop cancer. Thus demonstrating a key aspect of technology; it must be refined and tested/researched extensively before put in use.



Later even more sophisticated imaging devices evolved in MRI and PET scans thanks to massive advancement in computer science. The detailed images generated by these devices has allowed organ specific professions to develop. This has lead to better patient care as these doctors are even more knowledgeable in their specific area.

Computers have re-shaped hospitals completely. Firstly, in terms of monitoring devices which enabled patient vitals to be constantly measured. Simple things such as tracking and storing patient records has become significantly more efficient. Using computers makes it much easier and quicker to access potentially vital information about patients such as what medicine they have received, allergies, general history and much more.

Even though these advancement have been incredible in improving the quality of care delivered to patients. There have been ethical implications as well. For example ultrasound can be used to detect diseases in foetuses before they are born. This gives parents the difficult decision of whether to terminate the pregnancy or not.

Exciting developments

There is is a remarkable number of potentially groundbreaking technology in the works today. One of these is 3D printing. 3D printing is already being implemented in medicine; custom-made back braces for patients with scoliosis and 95% of all hearing aids among other examples. Recently, facial prosthetics (e.g. ears, noses, etc.) have been made using the technology. The biggest potential for 3D printing is in printing whole functional organs. While this has not been achieved yet, there have been promising advancements. One notable example is that a research company named Oranovo managed to print liver tissue (for testing purposes) which lasted for 40 days. If this feat is accomplished it will save countless lives. Firstly it would tackle the

problem of a shortage of viable organs for patients in dire need. Secondly it also presents the potential to make organs tailor made for each individual (using their stem cells) to avoid the problem posed by rejection and taking immunosuppressants.

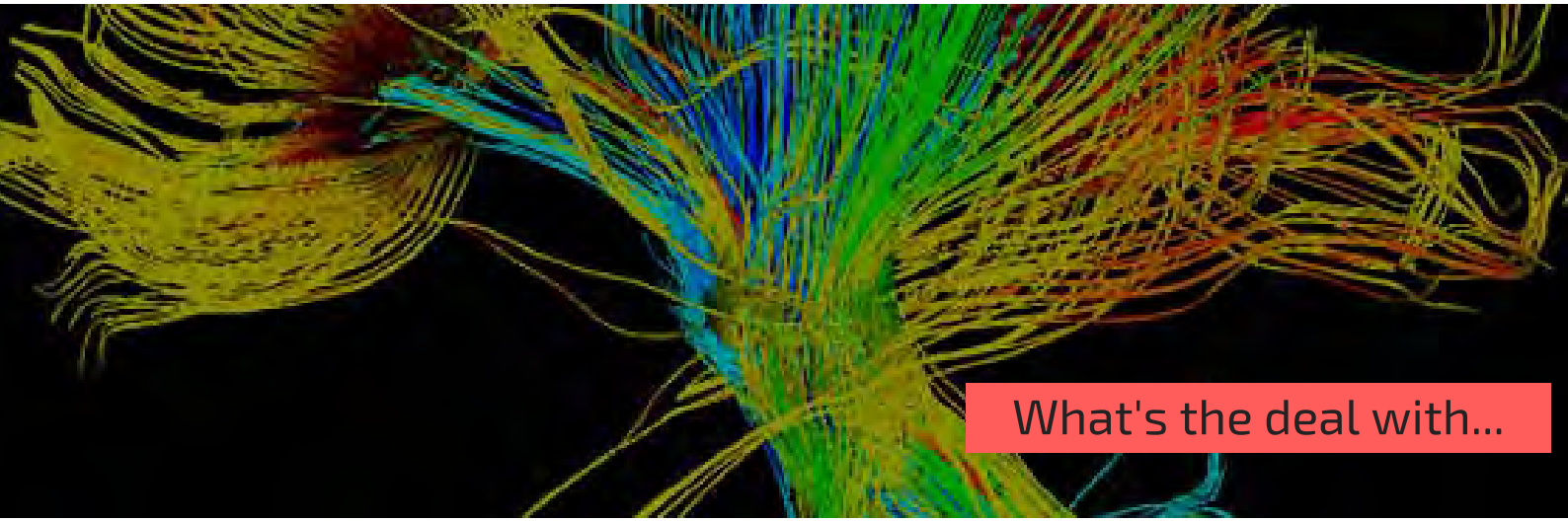
Brain-computer interface (BCI) technology is another promising area of research. In simple terms, BCI is the use of a device that allows the brain to control an "external activity" such as moving a cursor on a screen or moving a prosthetic limb. There has also been major improvement to this technology as it become more and more promising. A paralysed man was able to feel what a robot was touching as researchers at the University of Pittsburgh Medical Center connected the touch sensors on the robot's fingertips to the man's sensory cortex (areas of the brain that process sensory input). The hope is that one day this technology will be used to allow people with paralysis to have function again and also to allow people missing a limb to control a robotic one in its place.

There are many other developments in progress right now. Robotics is offering advancement sin many areas; a robotic exoskeleton has been made allowing paraplegics to walk, surgical robots are changing surgery as we know it. DNA sequencing could become common practice and with it bring more personalised treatments. Nanotechnology could become a useful tool in monitoring and treating conditions. There are countless exciting potentials out there for medicine.

Potential problems with technology

The benefits of technology in medicine have been remarkable. However there are a few problems that need to be addressed. There is concern that technology has "dehumanized" medicine. In addition, many of these techniques and devices are very expensive and therefore use up a lot of resources available to health providers. Therefore, these investments must have enough possible benefits in order to justify the cost. However, there are examples of investment into technology that are unlikely to provide significant benefits if any to society. This means that the opportunity to develop other technologies has been forgone. It is essential that we are able to be selective in the technology we chose to create and develop as to us our limited resources effectively

There is also something to be said about developing expensive machines where there is not significant need to validate the cost. These techniques can eat up big chunks of hospital's budget bringing up the question if they are worth the price.



FEATURED ARTICLE 1

THE FUTURE OF ANTIBIOTICS

BY ETHAN BENSADOUN

What are antibiotics:
“Antibiotics, also called antibacterials, they are a type of antimicrobial drug used in the treatment and prevention of bacterial infections. They may either kill or inhibit the growth of bacteria.” --- https://en.wikipedia.org/wiki/Antibiotics

The very first antibiotic was discovered by the great Alexander Fleming, it was called “penicillin”, in 1928. He was a Professor of Bacteriology at St. Mary's Hospital in London. This revolutionised the medical world, as it never had such advancements before. The use of this great antibiotic has saved countless lives, but it is unknown to how many but estimations have been made in the millions (80 to 200 million). People had suffered pneumonia, gonorrhea and rheumatic fever, before the antibiotic was introduced and these diseases were very hard to treat. Fleming discovered that the compounded bacteria and fungi was able to kill/stop the life of microbial species, he discovered this in his “mold juice”

Current antibiotics:
Antibiotics or drugs are commonly used nowadays for infections and different treatments. There are over 100 antibiotics used today, most are coming from a few rame of drugs. Here are the main classes of antibiotics and what diseases they treat:

Penicillins is an antibiotic that is used to treat certain infections caused by bacteria such as pneumonia, scarlet fever, and ear, skin, and throat infections. It also is used to prevent recurrent rheumatic fever and chorea.

Cephalosporins such as cephalexin (Keflex). It is used to treat various infections such as bacterial infections, skin infections, respiratory tract infections, and urinary tract infections.

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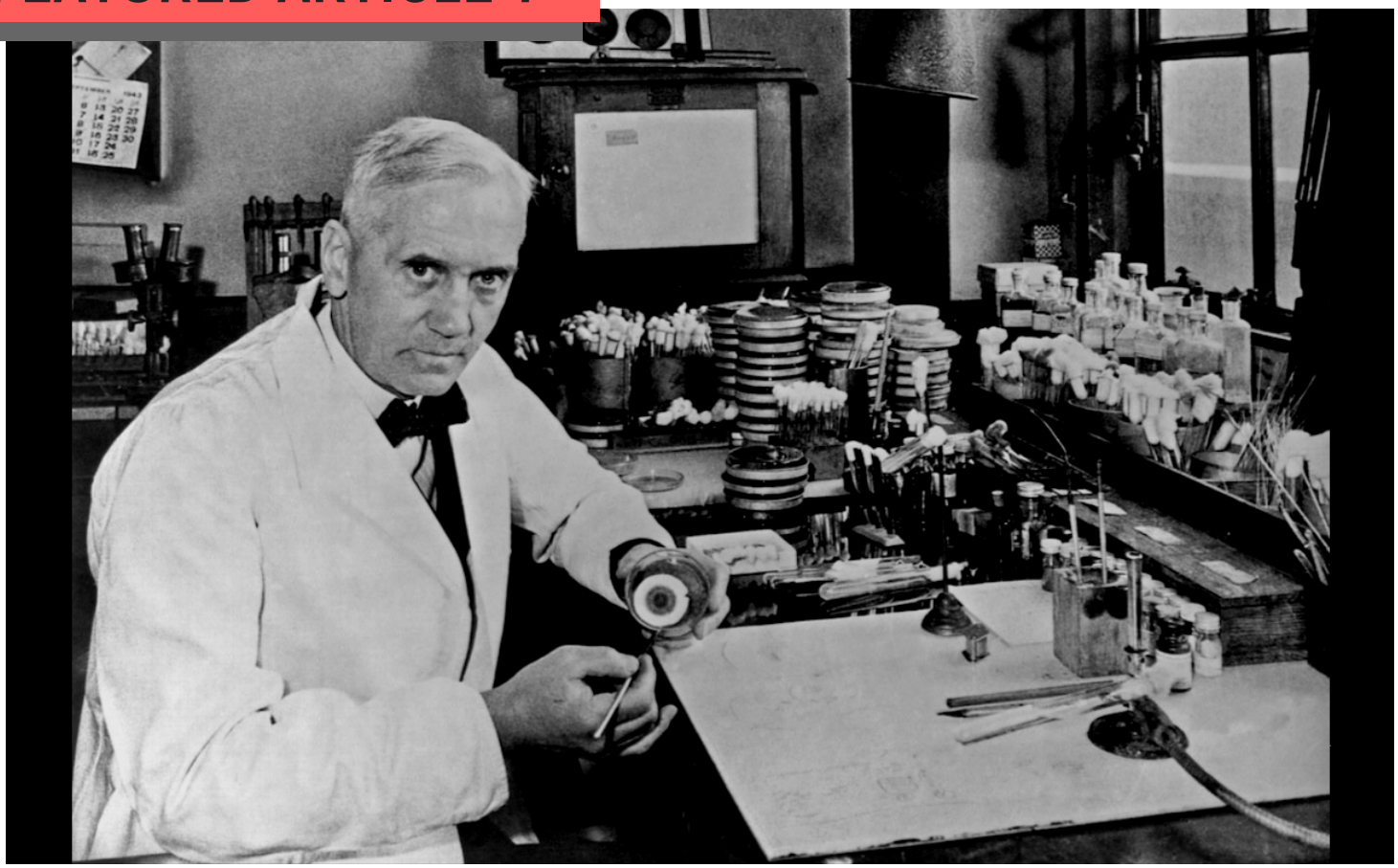


Macrolides such as erythromycin (E-Mycin), clarithromycin (Biaxin), and azithromycin (Zithromax). It is used to fight bacteria and treat various infections caused by said bacteria. Examples are; respiratory infections, ear infections, skin infections and STDs (Sexually Transmitted diseases).

Fluoroquinolones such as ciprofolxacin (Cipro), levofloxacin (Levaquin), and ofloxacin (Floxin).

Sulfonamides such as co-trimoxazole (Bactrim) and trimethoprim (Proloprim)

Tetracyclines such as tetracycline (Sumycin, Panmycin) and doxycycline (Vibramycin). It is used to treat acne, gonorrhea, urinary tract infections, chlamydia and gum disease.

Aminoglycosides such as gentamicin and tobramycin (Tobrex). This antibiotic is used for the treatment of very bad infections of the abdomen and urinary tract.

Problem with current antibiotics (drugs): Previously we have seen the use of many different types of antibiotics but, here we will be looking at the misuse and abuse of antibiotics. The truth about many antibiotics/drugs nowadays is that they are controlled and dominated in a market that is overtaken by the big pharmacies. The big pharmaceutical companies sell their products to hospitals and doctors, sometimes without warning them of the great side effects that can take place. This has ruined many people's lives, because a lot people depend on these pharmaceutical grade drugs. People can overdose on antibiotics and this can impact one's health as it is poisonous. They have become an addiction and the law cannot stop this because they are given the green light by governments across the world. This isn't to say that all antibiotics are bad and deadly, many help save millions, but should only be used to an extent and not as a life dependent.

FEATURED ARTICLE 1

That is why thankfully most doctors only give antibiotics when really needed as they don't want the use to backfire.

Antibiotic Resistance:
"Antibiotic resistance occurs when an antibiotic has lost its ability to effectively control or kill bacterial growth; in other words, the bacteria are "resistant" and continue to multiply in the presence of therapeutic levels of an antibiotic." --- emerald.tufts.edu

People should continue to use antibiotics in a safely controlled environment. Even though people (doctors) are educated enough and know that antibiotics should not be used when a person has a viral infection, the use of antibiotics unknowingly is the main source of antibiotic resistance. Using antibiotics continuously and intensely will no longer have an effect on the growing bacteria in a sick person's body.

New Technologies and Research:
Research and development on new medical drugs is expensive and governments and scientist need incentives to be able to discover new said drugs. It's been since 1987 that a new class of antibiotics have been discovered, 30 years!

Since antibiotics have met a lot of backlash and many people would like the use of antibiotics to be prohibited, new technologies and research has been made that can be used as an alternative or an evolved version. The fact is we still need antibiotics for treatment no matter the side effects.

With the growing concerns, doctors have found ways to defeat the growing numbers of antibiotic resistance. Many MIT medical engineers (Massachusetts Institute of Technology) have done this with new technologies called "bacteriophages" (viruses that infect and kill bacteria) and "phagemids" (particles that are able to produce toxins and can kill specific bacteria). Although these are interesting and possibly ground breaking discoveries they have many bad side effect on one's health. The bacteriophages cause the bacteria cells to burst, therefore releasing unwanted contamination into the body. Development has been made against the bursting the cells and phagemids (particles) can release DNA molecules in the cell called "plasmids" which duplicate once inside, they exhibit a protein (a molecule deadly to the bacteria). This is a major advancement as it will stop the bacterial cells to duplicate and they also will not burst.

"DESPITE PEER PRESSURE, YOU SHOULD CONSIDER THE RISKS YOU'RE SUBJECTING YOURSELF TO "

FEATURED ARTICLE 1

What to do with the Antibiotic Problem?
The BBC reported a slew of schemes to tackle this problem. A very interesting and possibly a method that works is “Using Bacteria Against Itself”, this may sound crazy for a person to theoretically infect themselves even more it may work and here’s how. Biotech companies want to use healthy microbes currently inside of human bodies and put them in pill form, this will then trigger an immune counter. This is still in the early stages of research but could very well be a technique used in the future. Another plan mentioned by the article was just to simply make current bacteria stronger, “vancomycin” a very strong drug only used during very bad situations. It can be re-engineered and might have to be the answer to our problems. It is seen in this way because the bacteria haven’t shown resistance to the drug yet.

People need antibiotics for treatment and antibiotic resistance has proven this.

BLOOD TEST FINDS CANCER BEFORE SYMPTOMS START - THE ADVANCEMENTS IN CANCER DETECTION

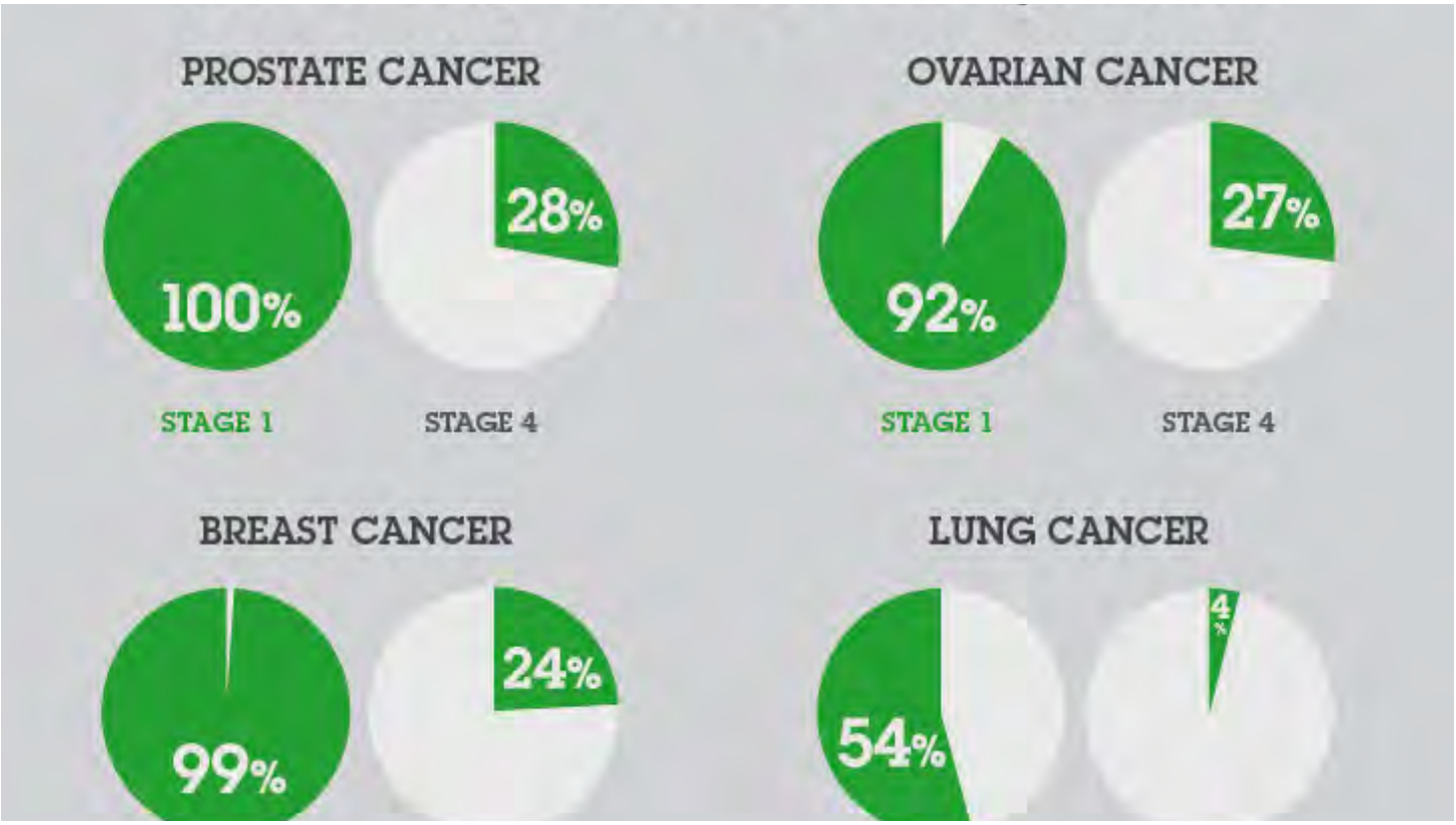
BY CLOE CHEUNG

The word ‘cancer’ strikes fear into all our hearts whenever we hear it. We often associate cancer with painful chemotherapy, deteriorating bodies and the dark inevitable end. However, with all the advancements made in technology these days, we are closer and closer to finding a way to effectively treat and perhaps even potentially cure cancer. For doctors, the most crucial point is being able to detect cancer at early stages, so that treatment could be administered with a higher probability of defeating the cancer.

In a study published in the Journal of Translational Medicine, a team of scientists at Johns Hopkins University stated that the blood test could detect a large range of cancers, including four of the biggest killers: breast, colon, lung and ovarian cancer. The test uses a method called ‘error correction sequencing (TEC-Seq)’, which is by scanning the blood for DNA fragments released by cancerous tumours. The study states that cancer patients have a high concentration of the cancerous DNA fragments in their blood. This test could even catch some late-stage cancers, but it only detected 59% of cases of cancer. While this is more than half, it is not accurate enough, so the team said they needed to do more work before it can be successful.

Dr. Victor Velculescu, the lead researcher and also co-director of cancer biology of Johns Hopkins Kimmel Cancer Center, stated that “If we are able to detect cancer earlier, our chances of saving lives would be much higher. The survival difference between late-stage and early stage disease in these cancers accounts for over a million lives worldwide each year.”

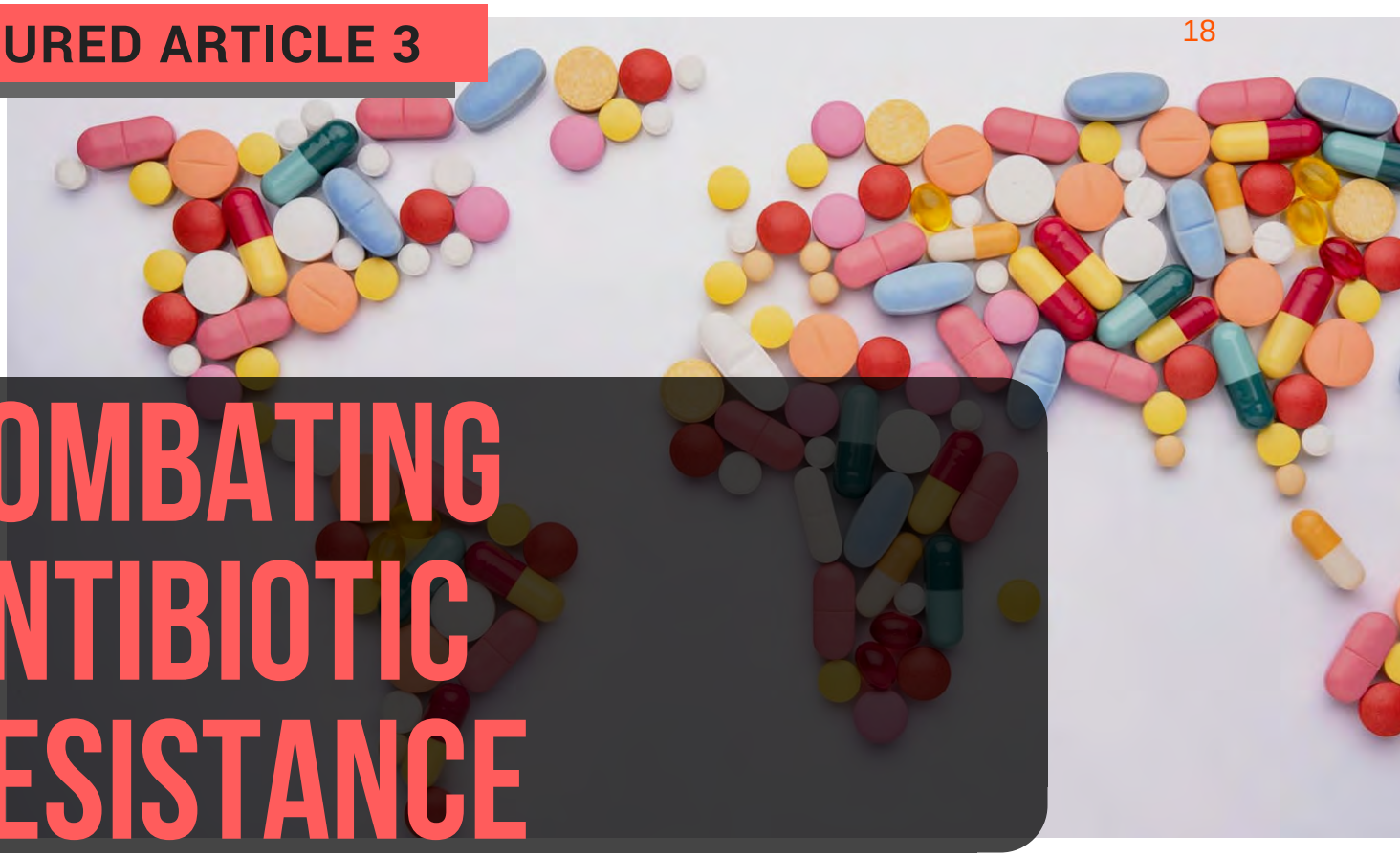
At the moment, there are other methods of detecting cancer. For example, doctors may take a biopsy - which is when doctors extract a small sample of tissue and send it to the lab so that pathologists can check for



abnormalities. What do they look for? The three main things pathologists look out for are:
1. Size/shape of cells
2. Size/shape of cell nuclei
3. Arrangement of cells
Based on their observations, pathologists will classify the type of cancer a patient has.

Another method is by using imaging procedures, such as a CT scan, ultrasound or MRI. These can give an image of organs to help doctors see if there is a tumour present or not. MRI (Magnetic Resonance Imaging) gives the best image out of the three mentioned above, so not only can it find a tumour, but it can also show which stage a cancer is in, and also show the depth of tumour growth in tissues. The advantages of MRI are the lack of severe side effects and the high accuracy.

Early detection and treatment is the best and most effective way of lowering risks of complications or death in cancer patients. Although there are currently some effective methods of detecting cancer, there is no harm in innovation and new methods. Perhaps, a combination of the methods mentioned in this article would give the most accurate diagnosis. Hopefully in the near future, scientists will perfect a way to diagnose cancer early on so that treatment can be administered faster!



COMBATING ANTIBIOTIC RESISTANCE

BY INES DURAND

As we see more and more news of antibiotic resistance, scientists are having to find more drugs to counter the resistant bacteria, which they then survive and become resistant to. Moreover, some human practices drive up the speed of antibiotic resistance and make it harder for bacterial diseases to be treated effectively. How bacteria become resistant, the human practices which increase this resistance, and how to combat it will be explored in this article.

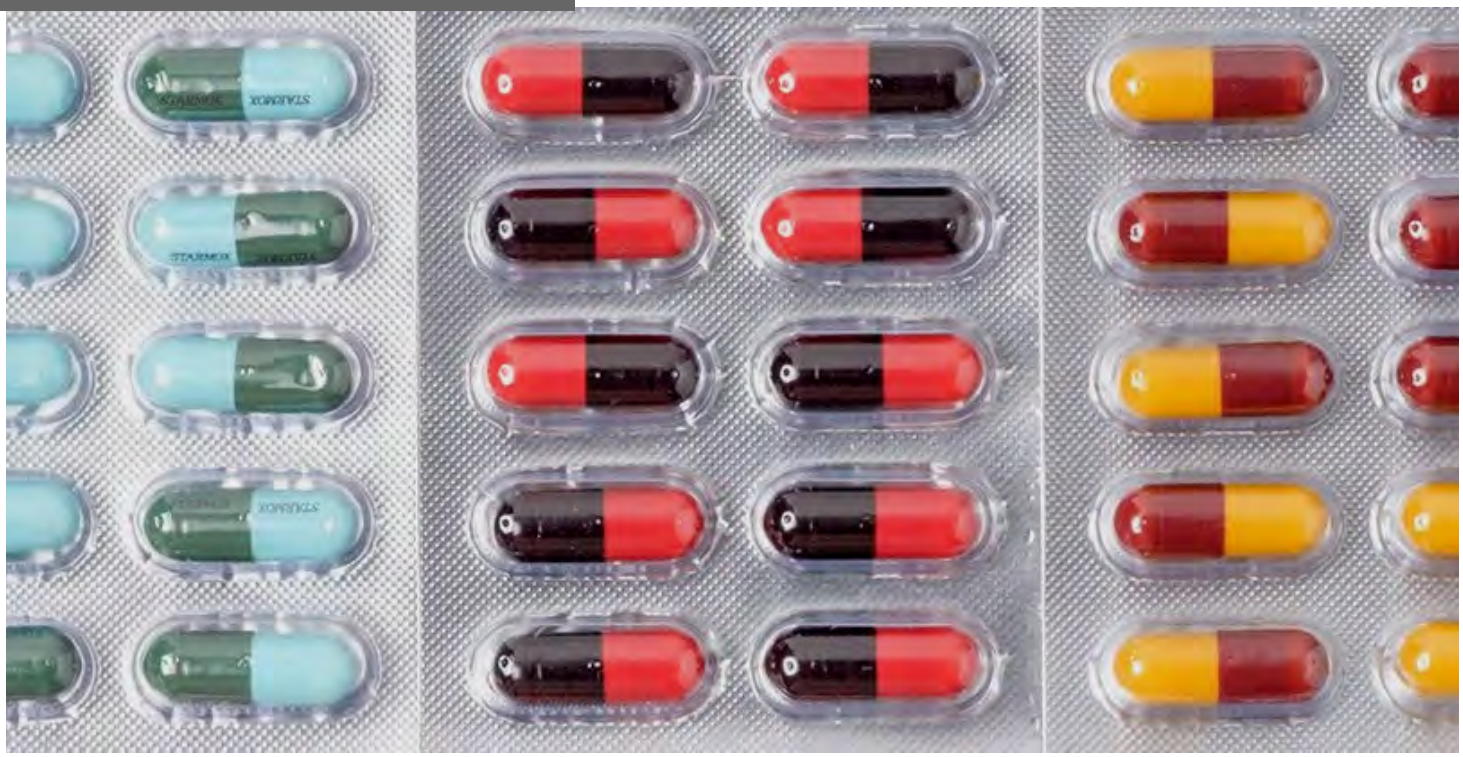
To know how bacteria become resistant, we first need to understand bacterial mutation. Bacterial mutations can be carried out “vertically”, where a new generation of bacteria inherit antibiotic-resistant genes from the parent, and “horizontally”, where part of their DNA (found in a structure called a plasmid) is exchanged with another bacterium’s DNA, hence receiving the antibiotic-resistant genes. Also, through a process by transformation, bacteria can collect pieces of DNA from other dead bacteria and transfer the genes to their own DNA.

Next, we also need to know the ways in which antibiotics kill bacteria. Different antibiotics carry it out in different ways: some slow down the growth of bacteria so that the immune system can deal with them more easily, some stop the the bacteria’s DNA from being replicated so that they don’t reproduce and slowly die off, and some rupture the cell wall and membrane of the bacteria so their contents spill out and they die. Now, the definition of drug resistance, or more specifically, antibiotic resistance, is “the ability of bacteria and other microorganisms to resist the effects of an antibiotic to which they were once sensitive”. This means that a bacterium could mutate and not die from the antibiotic, thus making it resistant to that drug...so the drug is now ineffective to that bacterium. Bacteria evolve ways to protect themselves like developing enzymes that deactivate the antibiotic, having stronger cell walls to avoid uptake of the drug, making pumps to eject the antibiotics from their system, or changing the structure of their receptors on the outside of the bacteria so the antibiotics don’t bind to them anymore.

A single resistant bacterium would not do much harm to the body- the immune system would get rid of it soon enough- but the problem starts if it is allowed to multiply, and then spread to other organisms. A problem is that some human practices increase the possibilities of bacterial mutation, and they provide conditions such that bacteria can multiply and spread very quickly within a population in which the consequences could be detrimental. The disparity between certain countries in administering antibiotics is the first problem: some countries do not have enough access to antibiotics while others provide them over-the-counter. The former do not have enough resources to cope with a disease which could lead to an epidemic, and the latter have to deal with resistant bacteria which could also cause widespread disease if not countered with other treatment. Another practice that accelerates bacterial mutation and spread is antibiotic use in meat production. Animals are kept in very cramped conditions with limited sanitation and hygiene, due to reasons of profit, cost and demand of meat. The unhygienic conditions provide a breeding ground for bacteria and disease, which is made worse with the fact that many animals are kept in these cramped areas, and allows disease to spread quickly. Therefore, many animals are given antibiotics to kill as many bacteria as possible and prevent them from getting sick. The product of this is that there are more and more bacteria becoming resistant to antibiotics. In addition, many people taking antibiotics discard the treatment when they begin to feel better, and the bacteria might not be completely wiped out, giving a chance for them to become resistant and spread. What's worse is that the result of globalisation connects practically every human on the planet, so it becomes so much easier for resistance to propagate around the whole world.

Sooner or later, as more and more antibiotic-resistant bacteria spread, the treatments used to previously kill bacteria become ineffective, and could lead to the emergence of superbugs. These are bacteria that are resistant to multiple types of antibiotics, and they are extremely deadly as they cannot be killed with the usual antibiotics, and, when contracted, could lead to big infections which are very hard to cure. There are already a variety of superbugs in the world, MRSA being one of the most well-known. According to the Australian Broadcasting Association, about 5% of multi-resistant MRSA strains in Australia could only be treated with vancomycin, which is considered as a “last-line” antibiotic. But in 1997 in Japan an MRSA strain was discovered to be partially resistant to vancomycin, which by now in 2017 would have gotten much more resistant. In America, MRSA kills more people than HIV/AIDS, Parkinson’s disease, emphysema, and homicide combined. Another important point is that a new class of antibiotics hasn’t been discovered for the last 30 years which shows the urgency of needing to find ways to fight resistance. All of these indicators warn that if we carry on misusing antibiotics more and more superbugs are going to develop, which will have serious consequences for us.

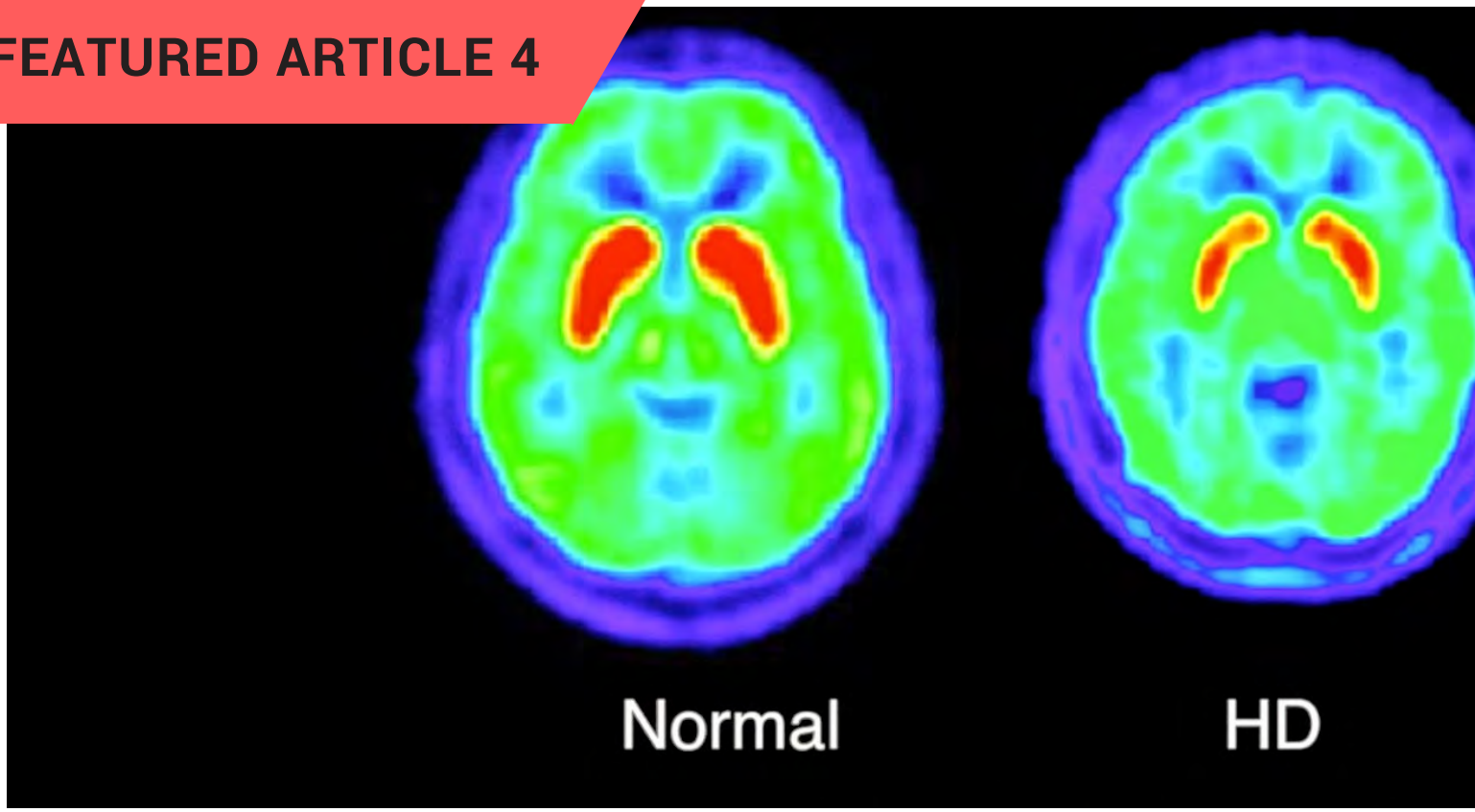
However, there are still solutions to combat antibiotic resistance, such as changing our attitude towards antibiotics. These should be treated as a last-resort drug and not be used often, so as to limit the likelihood of resistance of bacteria in the future. Doctors should eliminate unnecessary prescriptions to patients, for example, issuing antibiotics when they have a cold or the flu. The public also, not just doctors, should respect the power of these drugs and understand that taking antibiotics must be done with caution and are for serious diseases. Next, over-the-counter antibiotics should be banned, as many people might not know the proper



treatment steps or misuse them for a sickness that antibiotics are not designed to cure, and they should be reserved for those in the medical profession. In addition, the use of antibiotics in the livestock industry should also be banned and alternatively industries should invest in other ways to protect their livestock against disease, like vaccines, probiotics, immune modulators et cetera. In fact the EU has already banned antibiotics in meat production. Lastly, we could create an international trade system where all countries keep their medicinal resources open to all other countries in the world, which could open up trade as well as reduce the gap between medical demand and resources in many countries.

In conclusion, even though the war against antibiotics seems never-ending and a mammoth problem to tackle, it's never too late to start. Researchers and scientists all over the world are coming up with solutions to combat this, and shows that there is still hope to restore a bit of balance in the precarious world of antibiotics.

FEATURED ARTICLE 4



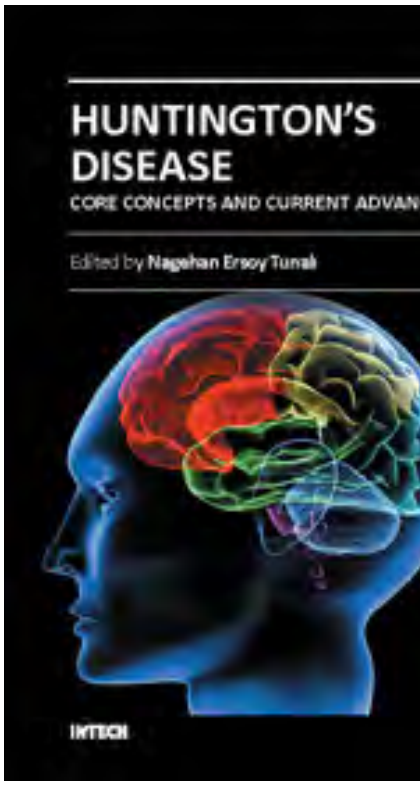
BBC: HUNTINGTON'S BREAKTHROUGH MAY STOP DISEASE

The defect that causes the neurodegenerative disease Huntington's has been corrected in patients for the first time, the BBC has learned.

An experimental drug, injected into spinal fluid, safely lowered levels of toxic proteins in the brain. The research team, at University College London, say there is now hope the deadly disease can be stopped. Experts say it could be the biggest breakthrough in neurodegenerative diseases for 50 years. Huntington's is one of the most devastating diseases. Some patients described it as Parkinson's, Alzheimer's and motor neurone disease into one.

Peter Allen, 51, is in the early stages of Huntington's and took part in the trial: "You end up in almost a vegetative state, it's a horrible end." Huntington's blights families. Peter has seen his mum Stephanie, uncle Keith and grandmother Olive die from it. Tests show his sister Sandy and brother Frank will develop the disease.

The three siblings have eight children - all young adults, each of whom has a 50-50 chance of developing the disease.



FEATURED ARTICLE 4

Worse-and-worse
The unstoppable death of brain cells in Huntington's leaves patients in permanent decline, affecting their movement, behaviour, memory and ability to think clearly.
Peter, from Essex, told me: "It's so difficult to have that degenerative thing in you.
"You know the last day was better than the next one's going to be."
- Huntington's generally affects people in their prime - in their 30s and 40s
- Patients die around 10 to 20 years after symptoms start
- About 8,500 people in the UK have Huntington's and a further 25,000 will develop it when they are older

Huntington's is caused by an error in a section of DNA called the huntingtin gene.
Normally this contains the instructions for making a protein, called huntingtin, which is vital for brain development.
But a genetic error corrupts the protein and turns it into a killer of brain cells.
The treatment is designed to silence the gene.

On the trial, 46 patients had the drug injected into the fluid that bathes the brain and spinal cord.
The procedure was carried out at the Leonard Wolfson Experimental Neurology Centre at the National Hospital for Neurology and Neurosurgery in London.
Doctors did not know what would happen. One fear was the injections could have caused fatal meningitis.

But the first in-human trial showed the drug was safe, well tolerated by patients and crucially reduced the levels of huntingtin in the brain.
Prof Sarah Tabrizi, the lead researcher and director of the Huntington's Disease Centre at UCL, told the BBC: "I've been seeing patients in clinic for nearly 20 years, I've seen many of my patients over that time die.
"For the first time we have the potential, we have the hope, of a therapy that one day may slow or prevent Huntington's disease.
"This is of groundbreaking importance for patients and families."

FEATURED ARTICLE 4

Doctors are not calling this a cure. They still need vital long-term data to show whether lowering levels of huntingtin will change the course of the disease.
The animal research suggests it would. Some motor function even recovered in those experiments.
Peter, Sandy and Frank - as well as their partners Annie, Dermot and Hayley - have always promised their children they will not need to worry about Huntington's as there will be a treatment in time for them.
Peter told the BBC: "I'm the luckiest person in the world to be sitting here on the verge of having that.
"Hopefully that will be made available to everybody, to my brothers and sisters and fundamentally my children."
He, along with the other trial participants, can continue taking the drug as part of the next wave of trials.
They will set out to show whether the disease can be slowed, and ultimately prevented, by treating Huntington's disease carriers before they develop any symptoms.
Prof John Hardy, who was awarded the Breakthrough Prize for his work on Alzheimer's, told the BBC: "I really think this is, potentially, the biggest breakthrough in neurodegenerative disease in the past 50 years.
"That sounds like hyperbole - in a year I might be embarrassed by saying that - but that's how I feel at the moment."
The UCL scientist, who was not involved in the research, says the same approach might be possible in other neurodegenerative diseases that feature the build-up of toxic proteins in the brain.
The protein synuclein is implicated in Parkinson's while amyloid and tau seem to have a role in dementias.
Off the back of this research, trials are planned using gene-silencing to lower the levels of tau.
Prof Giovanna Mallucci, who discovered the first chemical to prevent the death of brain tissue in any neurodegenerative disease, said the trial was a "tremendous step forward" for patients and there was now "real room for optimism".

FEATURED ARTICLE 4

But Prof Mallucci, who is the associate director of UK Dementia Research Institute at the University of Cambridge, cautioned it was still a big leap to expect gene-silencing to work in other neurodegenerative diseases.

She told the BBC: "The case for these is not as clear-cut as for Huntington's disease, they are more complex and less well understood.

"But the principle that a gene, any gene affecting disease progression and susceptibility, can be safely modified in this way in humans is very exciting and builds momentum and confidence in pursuing these avenues for potential treatments."

The full details of the trial will be presented to scientists and published next year.

The therapy was developed by Ionis Pharmaceuticals, which said the drug had "substantially exceeded" expectations, and the licence has now been sold to Roche.

commentary

BY ELLIOT TOPPING

A team at UCL has recently had a breakthrough in finding a cure for Huntington's disease, which affects around one in every 10,000 people.

Huntington's disease is a genetic disorder, one that is passed on from parents to their children, that causes a loss of normal thought processes, personality and behavioural changes, as well as the development of uncoordinated, jerky involuntary movements of the arms and legs, which makes patients increasingly unsteady on their feet.

Huntington's disease is an example of a neurodegenerative illness - that is, a disease that affects the nervous system and worsens gradually over time. It typically starts around mid-adulthood (30s or 40s), with the sufferers' quality of life drastically falling over time. Patients progress into a vegetative state until death results, which is often caused by complications which arise from the disease such as pneumonia, choking, or heart failure. Because of this, the life expectancy for a person afflicted with Huntington's is suggested to be around 10 to 20 years after diagnosis.

This condition is not only damaging for the patient, but has strong implications for their children. Huntington's disease is an example of a dominant genetic defect, meaning that if one parent has the disease, there is a 50% chance of passing it on to their children.

DNA is the genetic code found in every cell that provides instructions for making proteins. In order to make a protein (for example huntingtin), we make a copy of the huntingin gene from the DNA and take this copy to the ribosome, the part of the cell

BY ELLIOT TOPPING

that physically assembles the protein from these instructions. This 'copy' is known as messenger RNA (or mRNA) and the process by which it is copied is transcription and the process by which it is assembled into a protein is translation.

The disease affects this process. In sufferers, the huntingtin gene provides the wrong instructions resulting in the production of a faulty protein. In the huntintin protein, the base sequence of C-A-G (cytosine, adenine, and guanine) is repeated too many times. This results in the protein becoming too large and breaking apart into smaller segments, forming toxic fragments that interfere with processes including respiration and transport of materials in and out of cells, therefore damaging or killing neurones.

Furthermore, as of right now, there is no effective prevention or pre-symptomatic screening for Huntington's disease. This is why despite being in relatively early tests with only 46 participants, the drug is still groundbreaking as the potential impact it may have for our understanding of the body is enormous.

Professor Sarah Tabrizi, who is the lead researcher at UCL, has said: "For the first time we have the potential, we have the hope, of a therapy that one day may slow or prevent Huntington's disease."

The therapy consists of injecting the new drug into the fluid around the brain and the spinal cord. This drug is called an antisense drug which means it pairs with the mRNA. As it binds to the mRNA it prevents the intended protein from being produced, which is in this case, the faulty huntingtin protein.

This technique could potentially be used not only for Huntington's disease but also other illnesses such as cancers, HIV/AIDS, type 2 diabetes, Parkinson's and is already being used to help patients with muscular dystrophy, a genetic disorder resulting in the wasting of muscles.

However, as it is still early days for the treatment, even despite the positive responses in the study, it is still best to remain cautious in regards to the drug. Whilst it has been deemed safe for use, the long term effects have not yet been analysed. In addition it's effectiveness and results in other people may vary and not be not as successful or not successful at all.

It may still be years until the drug has been refined enough to be approved and marketed however many will be hoping the sooner the better. It's price is also not yet known, and may be too expensive to be bought by everyone needing it due to the lack of alternative treatments.

commentary

BY ELLIOT TOPPING

Despite this, on the whole, this drug could help many people around the world and have an enormous positive impact on many lives, increasing sufferer's quality of life immeasurably. There is also the question to be raised as to whether the drug could be given to their children as a preventive measure in order to prevent the onset of Huntington's disease for them later on in life.

Maybe more so than what the drug can achieve now, the fact that it is bringing hope to families who might have seen generations suffer from genetic diseases means their future is looking much less bleak.

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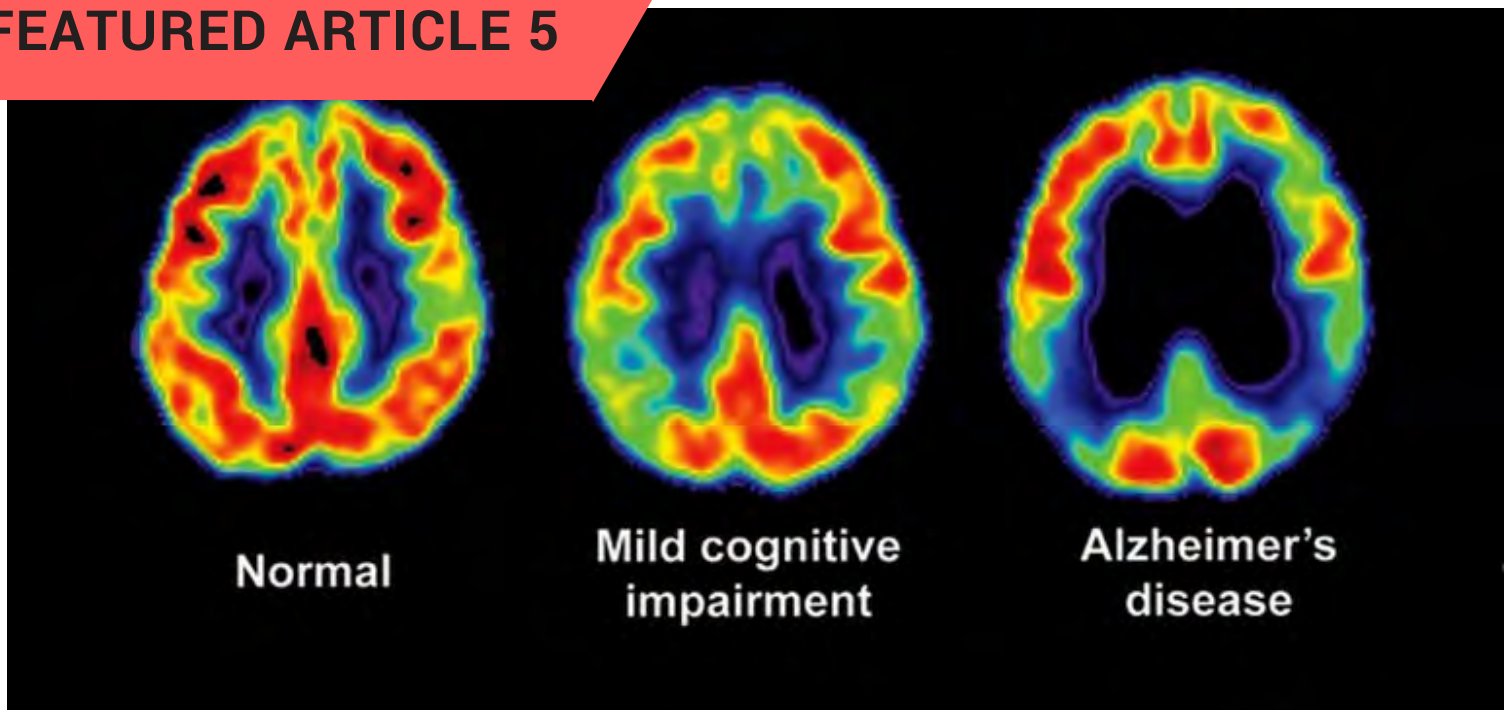

SCMP: VIRTUAL-REALITY GAME LAUNCHED TO STUDY ALZHEIMER'S – AND PLAYING IT COULD HELP WARD OFF THE BRAIN DISEASE TOO

Players of Sea Quest Hero will contribute data for scientific study of dementia, allowing researchers to link what someone can do in the game to what is going on in their brain

Sea Quest Hero is more than just the usual computer game in which players find their way through mazes, shoot and chase creatures – it also doubles as scientists' latest tool for studying Alzheimer's disease.

The game – downloadable from Tuesday [29th August 2017] in its virtual reality version – seeks to stimulate players' brains through a series of tasks based on memory and orientation skills, while gathering data to research dementia.

One of the first symptoms of Alzheimer's is loss of navigational skills. But data comparing cognitive response across a broad spectrum of ages is rare, and this is what the game seeks to provide.

The game – billed as the "largest dementia study in history" – has been developed by Deutsche

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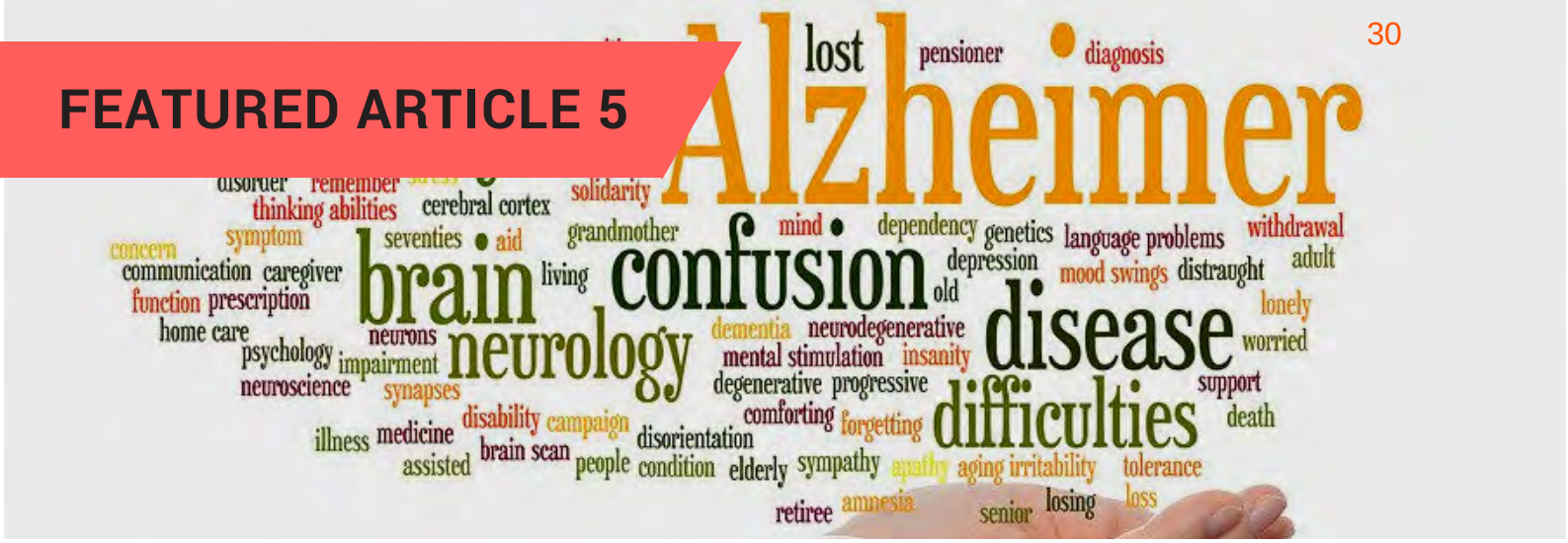

Telekom, Alzheimer's Research UK and scientists from University College London and the University of East Anglia in the UK. The mobile version, which came out in 2016, has already been downloaded three million times in 193 countries.

Playing the game for just two minutes, the website said, generates the same amount of data scientists would take five hours to collect in similar lab-based research.
With the equivalent of 63 years already played, scientists now have some 9,500 years worth of dementia research to go through.
"That gave us an enormous amount of information and it really allowed us to understand how men and women of different ages navigate in the game," David Reynolds, chief scientific officer at Alzheimer's Research UK, said.

Resolving the tasks requires the use of "different parts of your brain and different parts of your brain are used in different ways by different types of dementia – so it allows us to link what someone can do to what is going on in their brain", Reynolds added.

The addition of virtual reality will provide yet another layer of data.

"The headset technology is helping to track where the person is looking at all times as well as where they're going,"

Lauren Presser, one of the game's producers, said. "So we get to know whether people are lost and how they behave in those situations ... Every single one of those experiments is helping us gather data around spatial navigation."

Nearly 50 million people around the world suffer from dementia and Alzheimer's according to the latest estimates. This figure could balloon to 132 million by 2050.
In Hong Kong, a Department of Health and Chinese University of Hong Kong joint study in 2006 estimated the dementia rate was 33 per cent in people aged over 85. The Charles K. Kao Foundation for Alzheimer's Disease puts the number of dementia sufferers in Hong Kong at more than 70,000, and says that number is expected to double by 2021. By 2036, the foundation estimates 280,000 Hong Kong people will suffer from dementia.
There is no cure for the disease, but the game's creators hope it could eventually enable diagnosis and treatments of patients far earlier than is currently possible.

Reynolds said playing the game could in itself help with prevention. "We know keeping your brain fit and active, like keeping your body fit and active, is good and is helping to reduce your risk of dementia or slowing its progression down if you have it," he said.

FEATURED ARTICLE 5

NEW SCIENTIST: AI SPOTS ALZHEIMER'S BRAIN CHANGES YEARS BEFORE SYMPTOMS EMERGE

Artificial intelligence can identify changes in the brains of people likely to get Alzheimer's disease almost a decade before doctors can diagnose the disease from symptoms alone.

The technique uses non-invasive MRI scans to identify alterations in how regions of the brain are connected.

Alzheimer's is a neurodegenerative disease that is the leading cause of dementia for the elderly, eventually leading to loss of memory and cognitive functions.

The race is on to diagnose the disease as early as possible. Although there is no cure, drugs in development are likely to work better the earlier they are given. An early diagnosis can also allow people to start making lifestyle changes to help slow the progression of the disease.

In an effort to enable earlier diagnosis, Nicola Amoroso and Marianna La Rocca at the University of Bari in Italy and their colleagues developed a machine-learning algorithm to discern structural changes in the brain caused by Alzheimer's disease.

FEATURED ARTICLE 5

First, they trained the algorithm using 67 MRI scans, 38 of which were from people who had Alzheimer's and 29 from healthy controls. The scans came from the Alzheimer's Disease Neuroimaging Initiative database at the University of Southern California in Los Angeles.

Positive discrimination

The idea was to teach the algorithm to correctly classify and discriminate between diseased and healthy brains. The researchers divided each brain scan into small regions and analysed the neuronal connectivity between them, without making any assumptions about the ideal size of these regions for diagnosis.

They found that the algorithm made the most accurate classification of Alzheimer's when the brain regions being compared were about 2250 to 3200 cubic millimetres. This was intriguing, says La Rocca, since this is similar to the size of the anatomical structures connected with the disease, such as the amygdala and hippocampus.

The team then tested the algorithm on a second set of scans from 148 subjects. Of these, 52 were healthy, 48 had Alzheimer's disease and 48 had mild cognitive impairment (MCI) but were known to have developed Alzheimer's disease 2.5 to nine years later.

The AI distinguished between a healthy brain and one with Alzheimer's with an accuracy of 86 per cent. Crucially, it could also tell the difference between healthy brains and those with MCI with an accuracy of 84 per cent. This shows that the algorithm could identify changes in the brain that lead to Alzheimer's almost a decade before clinical symptoms appear. The researchers were limited by the scans available from the database, so they weren't able to test whether the algorithm could predict the onset of disease even earlier.

Early diagnosis

Alzheimer's disease has been linked to the formation of sticky beta-amyloid plaques and neurofibrillary tau tangles in the brain. "Nowadays, cerebrospinal fluid analyses and brain imaging using radioactive tracers can tell us to what extent the brain is covered with plaques and tangles, and are able to predict relatively accurately who is at high risk of developing Alzheimer's 10 years later," says La Rocca. "However, these methods are very invasive, expensive and only available at highly specialised centres."

In contrast, the new technique can distinguish with similar accuracy between brains that are normal and the brains of people with MCI who will go on to develop Alzheimer's disease in about a decade – but using a simpler, cheaper and non-invasive technique. More work will be needed to distinguish between people with MCI whose brains go on to age normally, or who might develop other kinds of dementia.

Blood tests that look for biomarkers of Alzheimer's could be even cheaper and simpler than the new technique, but none are on the market yet. "There are no blood tests for Alzheimer's disease," says Goran Šimić at the University of Zagreb in Croatia. "There have been some attempts, but without much success yet."

Next step

Patrick Hof at the Icahn School of Medicine at Mount Sinai in New York is intrigued by the new test. He says that a method that might predict the disease a decade before it is fully expressed would be "incredibly valuable" should preventative therapeutics emerge.

La Rocca says her team now intends to extend the technique to help with the early diagnosis of other neurodegenerative conditions such as Parkinson's disease. "It's a method that is very versatile," she says.

commentary

BY HADRIAN WONG

Alzheimer's disease is a neurological disorder that starts off with minimal effects but worsens over time. It is the most common type of dementia, with up to 80% of its cases being Alzheimer's disease. As Alzheimer's is mainly caused by the death of brain cells, it generally results in the symptoms of difficulty remembering newly acquired knowledge at the beginning. This then progressively gets worse as severe symptoms, such as disorientation, mood swings, confusion of time and difficulty speaking, swallowing and walking.

1. Worsened ability to receive and remember information
2. Impaired judgement and thinking
3. Decline in visuospatial abilities
4. Difficulty it literacy skills (reading, writing and speaking)
5. Disorientation ie loss of sense of direction
6. Changes in personality and behaviour

While the main causes of Alzheimer's remain uncertain, researchers believe that the causes may be along the lines of ageing and a family background with the same disease.

With this in mind, diagnosis typically involves doctors taking data from a patient involving its symptom history, neurological function, blood and urine samples and brain scans (CT, MRI and EEG). Patients may also be asked to take cognitive tests.They then use the data to narrow down to a final diagnosis. This form of diagnosis is not only lengthy but also not a simple process at all.

Luckily, with new breakthroughs there has been more efficient ways in which Alzheimer's disease can be diagnosed as reported by both The South China Morning Post and New Scientist. Although a cure has still not been made for this disease, researchers are making large advancements

commentary

BY HADRIAN WONG

and are allowing potential patients of Alzheimer's to be much more prepared and easing their symptoms earlier.

While the new technologies being brought into medicine for diagnosis may seem to be massive breakthroughs, there is, however, some concern to this technology. When prompted with the term 'AI', some people immediately think of world ending situations depicted in sci-fi films. This leads to one of the big questions, 'how much can AI be relied on?' While the answer may not be clear at this moment, researchers such as Stephen Hawking have warned about AI's potential dangers, in fact, most recently in July 2017, Facebook's AI chatbots were shut down as they began to speak in their own dialect, incomprehensible to humans. Does this make us doubt the future of AI?

Another major concern would be accessibility. Would patients from LEDCs and rural areas be able to afford or even access such technology? The mobile game mentioned in The South Morning Post relies heavily on mobile devices and virtual reality equipment. In the same way, what would an AI software cost just to diagnose diseases but not cure it? Although new technologies may be very beneficial to a large proportion of people, but would it be sufficient enough to reach all corners of the world?

Overall, when thinking about new technology coming into medicine, both the advantages and concerns have to be thought out. Otherwise, we may end up dealing with unwanted consequences.

Glossary

Dementia: According to Medical News Today, the term dementia is described as 'a loss of mental ability associated with gradual death of brain cells.'

Visuospatial: The processes involving visual or spatial awareness

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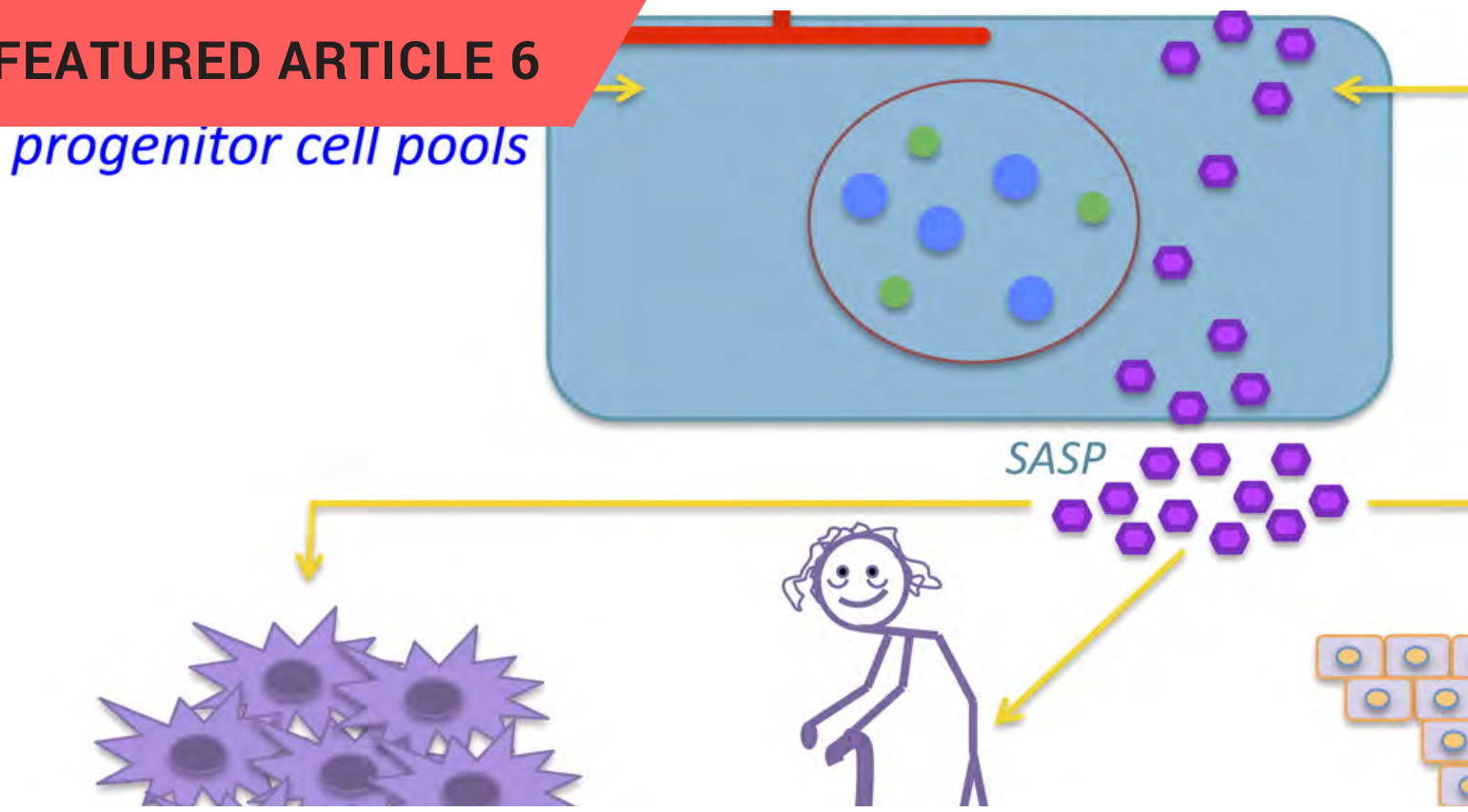
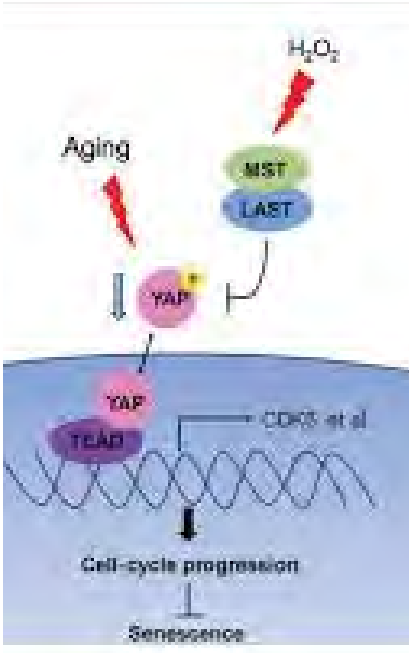


CELLULAR SENESCENCE

BY HARUTO IGUCHI

Cellular Senescence is the phenomenon by which a cell ceases to divide. Fibroblasts can reach a maximum of 50 cell divisions before becoming 'Senescent'. This is known as 'replicative senescence' or the Hayflick limit. Replicative senescence is the result of telomere shortening that ultimately triggers a DNA damage response. Cells can also be induced to senescence via DNA damage in response to elevated Reactive Oxygen Species (ROS), activation of oncogene (a gene that has the potential to cause cancer. Most normal cell will undergo a programmed form of cells death or apoptosis this happens when critical functions are altered and malfunctioning.



Activated oncogenes can cause those cells designated for apoptosis to survive and

FEATURED ARTICLE 6

proliferate instead. Most oncogenes began as proto-oncogenes which are normal genes that mutated in certain ways to become an oncogene) and cell-cell fusion (when uni-nuclear cells combine to form multinuclear cells also known as syncytium. It occurs during differentiation of muscle, bone and trophoblast [cells forming in the outer layer of a blastocyst which provide nutrients to the embryo and develop into a large part of the placenta], cells during embryogenesis [is the process by which the embryo forms and develops] and morphogenesis [biological process that causes an organism to develop its shape].

It is a necessary event in the maturation of cells so that they maintain functions throughout growth) senescent cells can no longer replicat, they remain metabolically active and commonly adopt an immunogenic phenotype. An Immunogenic Phenotype is the ability of a particular substance, such as an antigen or epitope (antigenic determinant) to provoke an immune response in the body of a human or other animals.

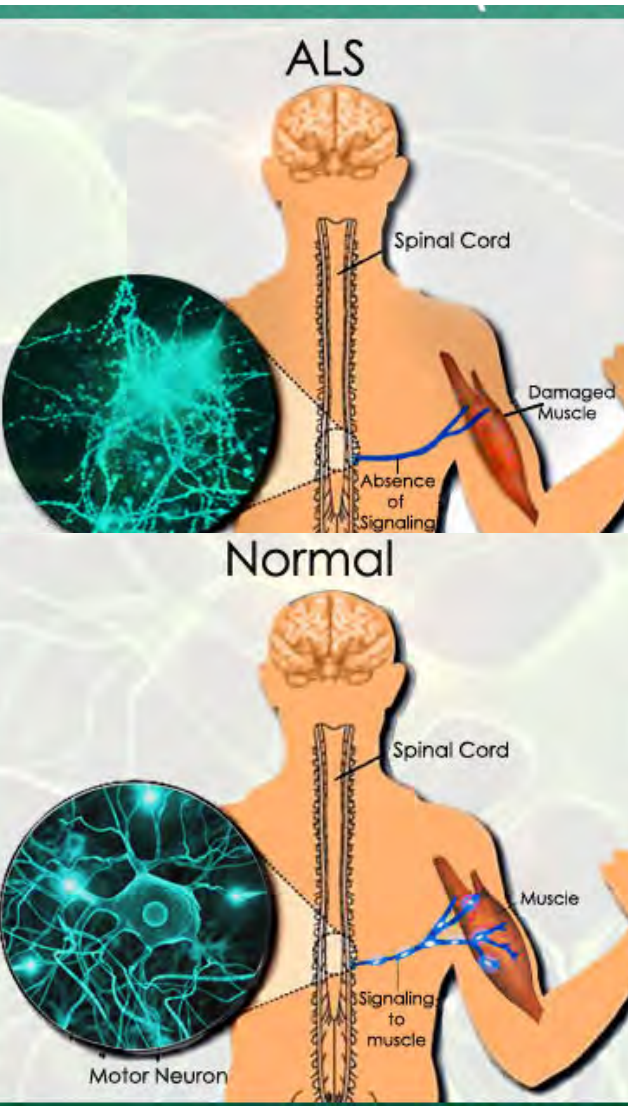
Wanted immunogenicity is related with vaccines where injection of an antigen provokes an immune response against the pathogens aiming at protecting the organism. Vaccine development is a complex multistep process.

Unwanted immunogenicity is an immune response by an organism against a therapeutic antigen (recombinant protein or monoclonal antibody). This reaction leads to production of anti-drug-antibodies (ADAs) inactivating the therapeutic effects of the treatment and in rare cases inducing adverse effects. The prediction of immunogenic potential of navel protein therapeutics is a challenge in biotherapy.

DIAGNOSIS OF THE MONTH

ALS

By Sacha Lee



ALS: The Progress Made

ALS is a neurodegenerative disease that has been estimated to be "responsible for as many as five of every 100,000 deaths in people aged 20 or older." Symptoms of this disease progressively worsen throughout the duration of the illness, until it eventually renders the subject's unable to function properly to the stage where aid in performing simple, mundane tasks (such as eating or drinking) is necessary.

The stages of ALS:

Early stages: Patients may experience muscle spasms, and or stiffness of muscles. "The person may experience fatigue, poor balance, slurred words, a weak grip, tripping when walking or other minor symptoms."

Middle stages: Muscles are weakened, and some are even paralysed. The patient may experience joint pain, require help performing day-to-day activities, and this weakness in muscles (including those that help a person swallow and breathe) may lead to choking or trouble breathing.

Late stages: Majority of voluntary muscles are paralysed. "Mobility is extremely limited, and help

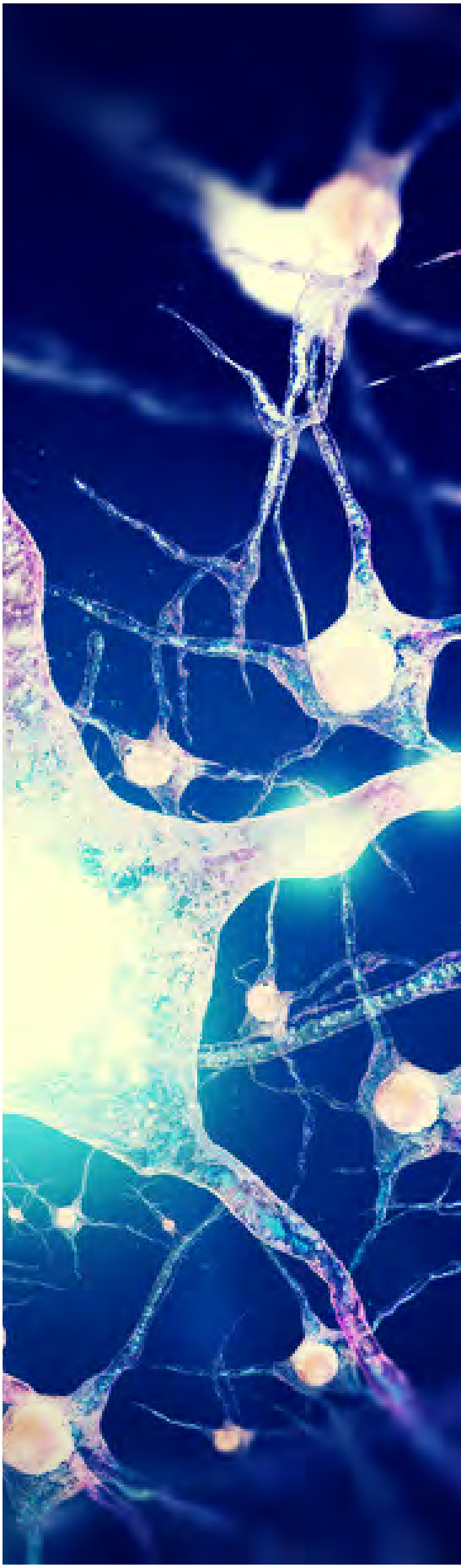
is needed in caring for most personal needs", "poor respiration may cause fatigue, fuzzy thinking, headaches and susceptibility to pneumonia" and "speech, or eating and drinking by mouth, may not be possible."

Awareness for ALS dramatically increased after the extremely popular "ALS Ice Bucket Challenge". In 2014, "More than 17 million people participated in the Ice Bucket Challenge to support ALS". This lead to a staggering $115 million in donations to the ALS association. Out of the $115 million, $77 million was dedicated to research for ALS (The other $38 million being donated towards: patient and community services, public and professional education, fund-raising, and external processing fees). At the moment, there is no cure for ALS, only a drug that can modestly prolong a patient's life.

"As nerve cells in the brain and spinal cord die, a patient's muscles, which are no longer connected to living nerves, start to waste away. On average, within two to five years after an ALS diagnosis, patients lose their ability to breathe and they die."

One research team is investigating the possibility of applying medicine used in order to regulate cardiac rhythm (in patients with cardiac problems) to stabilise the nerve cells which gradually deteriorate as the disease progresses. Another research team is investigating the option of using stem cells in order to replicate a patient's neurons. Teams are also receiving funding in order to map the genetic makeup of ALS patients, in order to better understand the disease and how it works.

Fluids from the brain, spinal cord and blood are also a key component of research for the disease. These fluids contain the biomarkers of the disease, which can be used to work towards finding a cure for ALS. "To hunt for these "biomarkers," the ALS Association is budgeting $1.4 million to the Barrow Neurological Institute, Iron Horse Diagnostics, and the CreATe consortium to



collect and study these types of fluids."

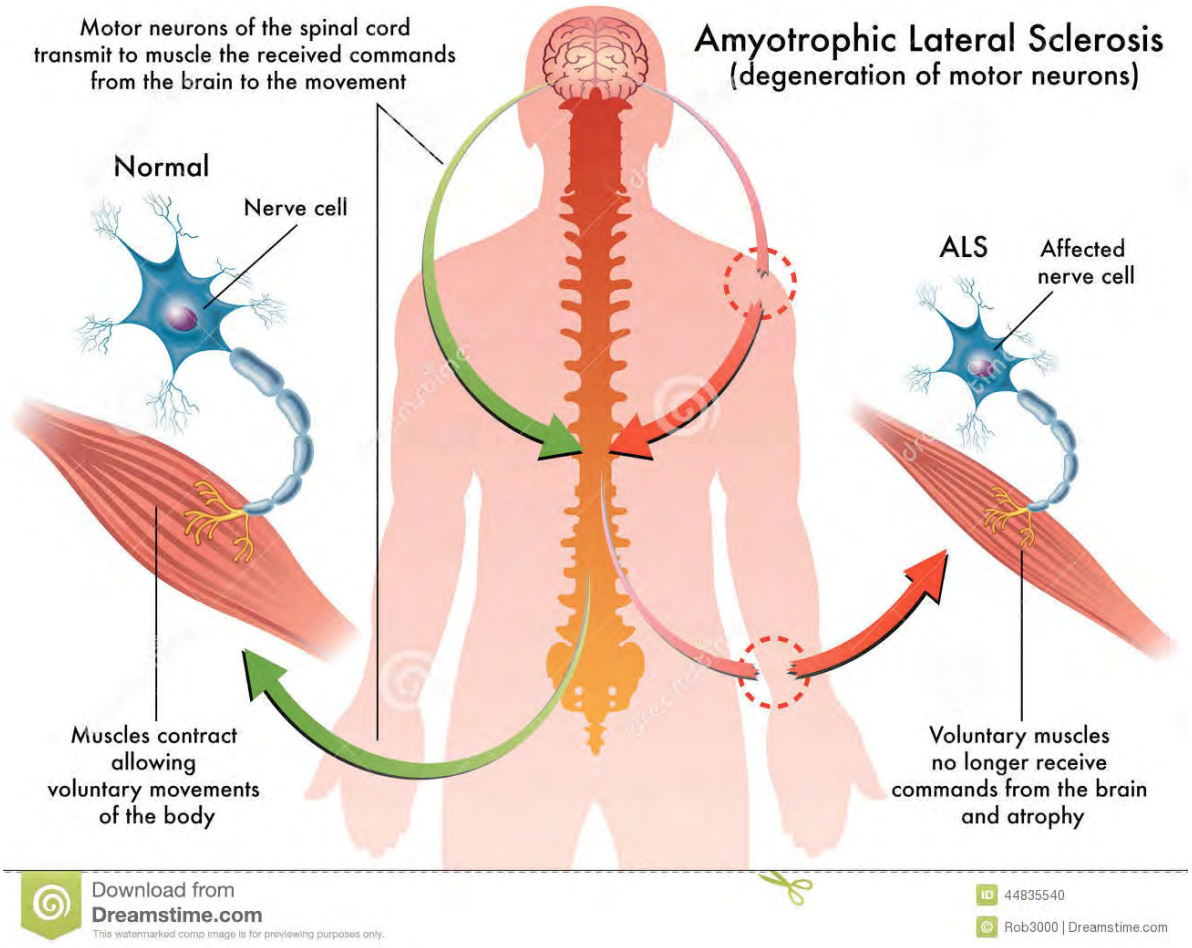
Lastly, donations are also going to the drug maker "Cytokinetics" which will gather blood samples from ALS patients. "The fluid's being collected as part of an advanced clinical trial investigating whether a drug can help patients breathe".

Despite scientists still unable to determine a cure for ALS, there have been many medical breakthroughs.

These breakthroughs include:
i) Project MinE led to "The discovery of the NEK-1 gene, now known to be among the most common genes that contribute to the development of ALS, made headlines around the globe."

ii) A team of scientists "led by Dr. Nazem Atassi, used PET imaging to successfully scan the first person living with ALS to measure inflammation in the brain, a promising first step in this imaging biomarker study."
iii) ",Investigators at Cedars-Sinai gained approval from the FDA to test the safety of a combination stem cell-gene therapy in a clinical trial."
iv) IBM's Watson supercomputer discovers 5 new ALS genes.

Despite the lack of a cure for ALS, with the evolution of new technology which in turn expands the ability of research, huge developments can be expected in the fight against ALS.



Social Media and Mobile Devices

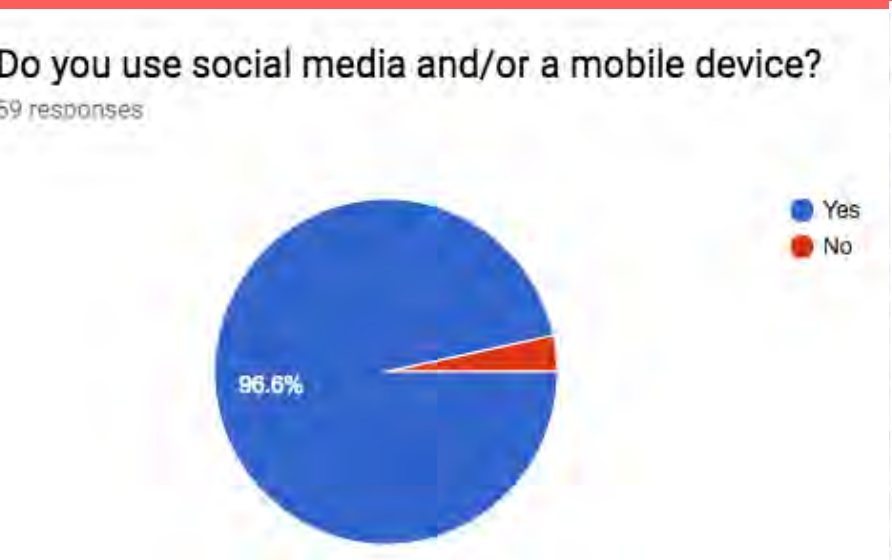
By Aarmann Mohan

The use of social media and mobile devices impacts a teenager psychologically and physically in terms of health. Many teenagers/children are starting to get mobile phones and utilise social media applications at an earlier age than ever before. The average time spent on an electronic device or on social media is only increasing as time goes by. This may lead to various health prospects which need to be addressed: the mental health (emotional well being) of teenagers, eyesight problems, the lack of sleep and distractions from studies.

Who uses Social Media or a Mobile Device?

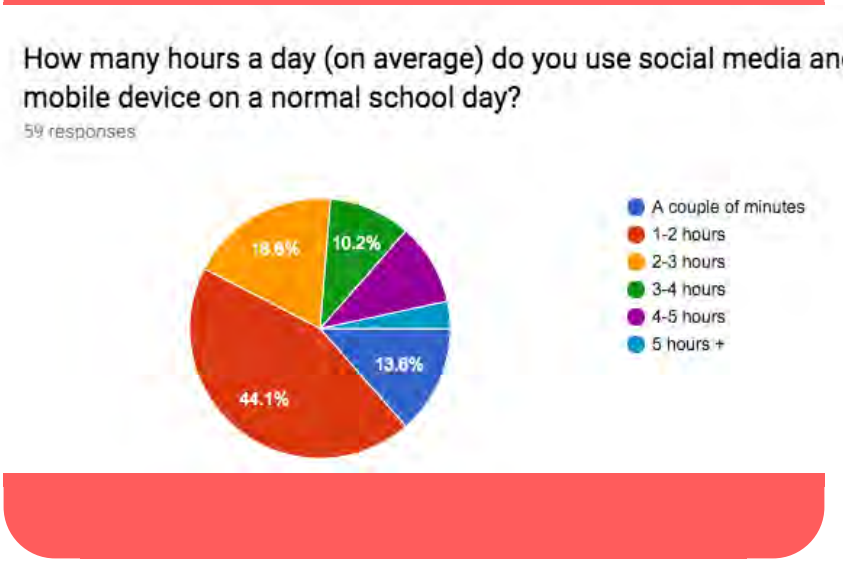
As seen in our survey, the majority of students in the French International School use social media and/or a mobile device. 97% of students across the ages of 11 to 18 use social media and/or a mobile device and the remaining 3% do not.

There are a variety of different ages as to the students in the school got their first mobile device. The below table shows the ages at which students owned their first device corresponding to the frequency at which this occurs.

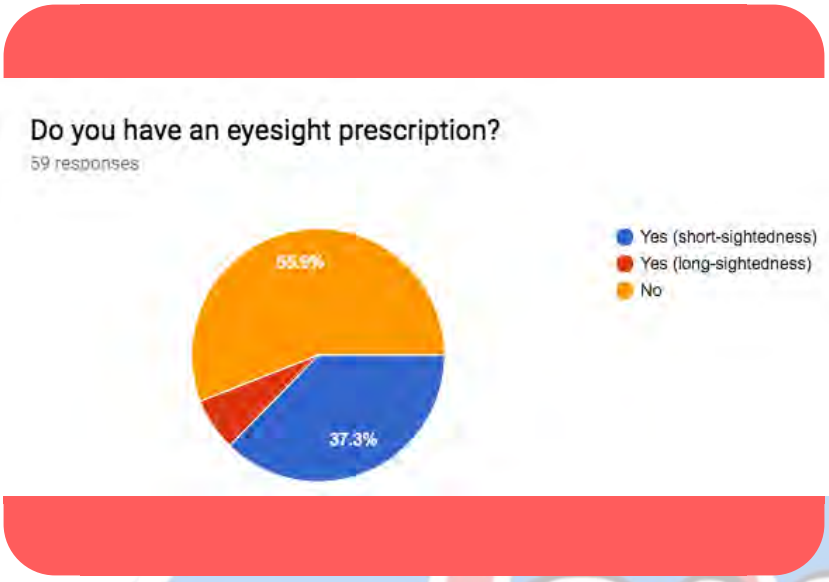


Age	Frequency
7	1
8	6
9	3
10	13
11	16
12	12
13	5
14	2

The above table shows that students at the school are getting their first mobile device as early as the age of 7 and some at an older age of 14. This proves that most students (if not all) have access to a device through the majority of their teenage life and hence various health issues arise.

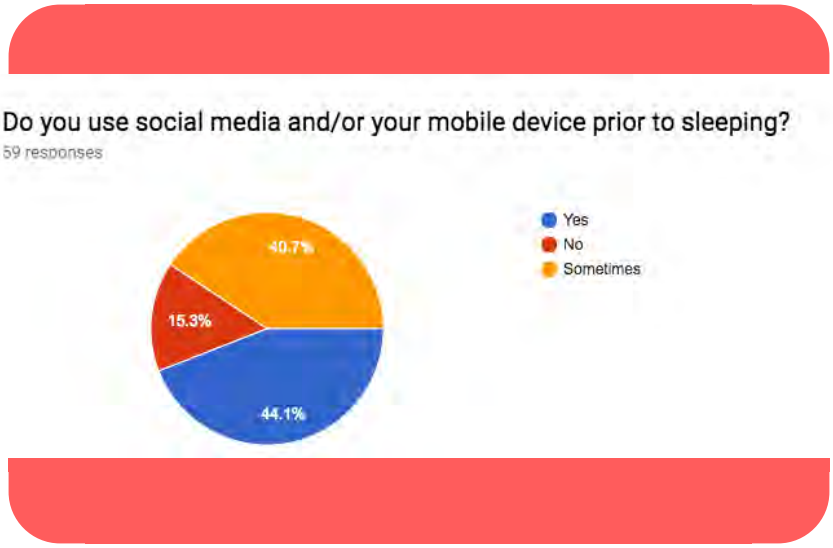


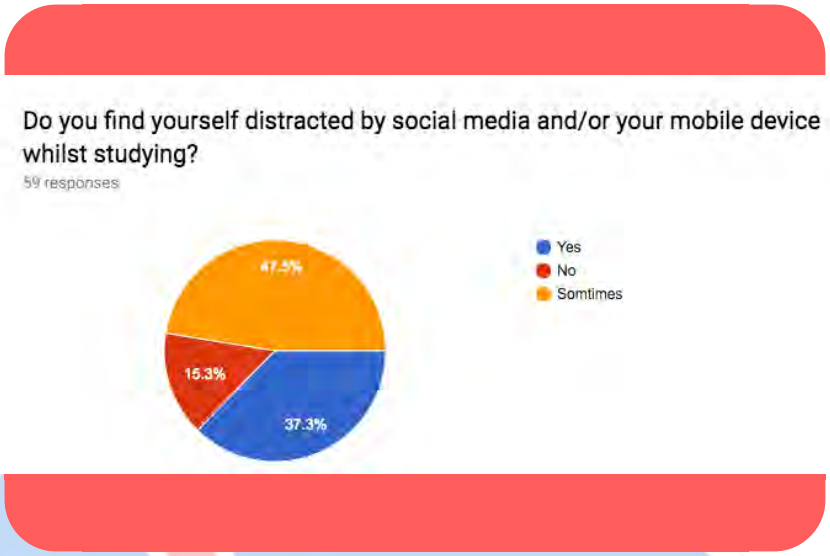
Time Spent on Social Media or Mobile Device:
Various students, use social media on an average school day at various lengths of time. The most common one because one to two hours a day. It was also observed that the older years (i.e. year 10-13) used their mobile device or spent time on social media for longer periods of times than the younger years (i.e. year 7-9).

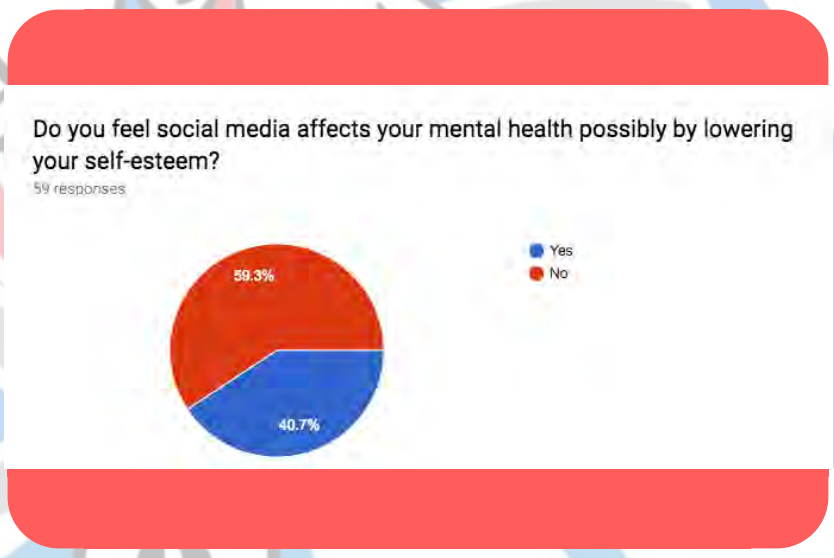


Mental Health:
According to the survey results, the majority of students feel as if that social media does not affect one's health psychologically. 59.3% believe that it does not whilst 40.7% believe it does. According to the trend in ages that chose each option, most of the senior students (i.e. year 10-13) believe that social media affects one's mental health whereas, the younger years (i.e. years 7-9) believe it does not. Perhaps this links to the amount of usage spent on a mobile device as seen earlier, where the students in the more senior years spend on average, more time on their personal mobile device. The RSPH (Royal Society of Public Health) and have stated that social media causes the following psychological impacts on the brain: high levels of anxiety, depression, bullying and FOMO, or the "fear of missing out."

Eyesight:
According to the survey, it is seen that 55.9% of students do not require an eyesight prescription whist, 41.1 do require it. Technology does have impact on the health of eyes. Short-sightedness usually occurs when the eyes grow slightly too







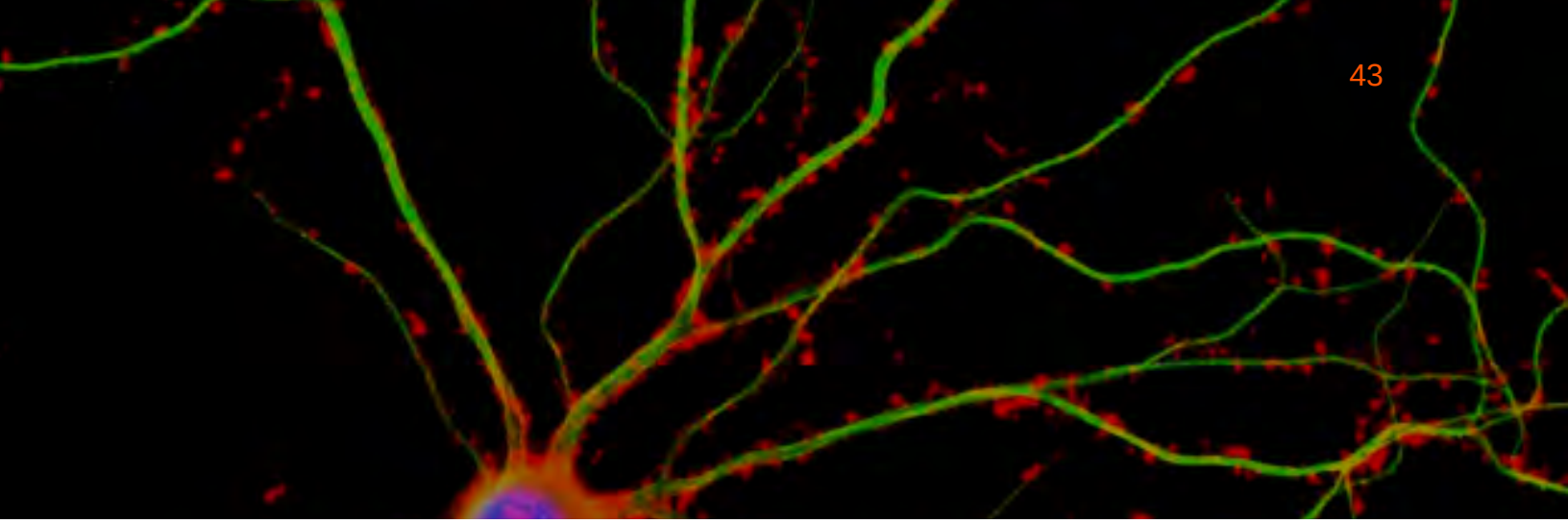
long. This means that light doesn't focus on the light-sensitive tissue (retina) at the back of the eye properly. Instead, the light rays focus just in front of the retina, resulting in distant objects appearing blurred. This can be prevented by getting regular eye tests and making sure the prescription on your glasses or contact lenses are up to date, having a nutritional diet and spending time in the outdoors looking at natural light rather than the electromagnetic rays being emitted from your device.

Sleep and Usage:

The survey states that, the majority of students at the school have used social media or their device regularly or sometimes (84.8%). The remaining 15.3% state that they do not use their device prior to sleeping. Using electronic devices before bed delays your body's internal clock, this suppresses the release of the sleep-inducing hormone melatonin, and makes it more difficult to fall asleep. This is largely due to the short-wavelength, artificial blue light that's emitted by these devices. This compromises alertness the next morning. Over time, these effects can add up to a significant, chronic deficiency in sleep. After several sleepless nights, the mental effects become more serious. Your brain will fog, making it difficult to concentrate and make decisions. You'll start to feel down, and may fall asleep during the day. Your risk of injury and accidents at home, work and on the road also increases.

Distraction and Social Media:

According to the results, 84.8% have been distracted by their mobile phone regularly if not sometimes. Whilst, the remaining 15.3% state they do not get distracted by social media or their device.



Negative Impacts of Utilising Device of Social Media:

1. Negatively Affects Emotions

The presence of a cell phone while two or more people are talking face-to-face can generate negative feelings toward the person who has his or her device visible. It is said that those who spoke about significant events in their lives with a notebook present experienced a feeling of closeness and trust in the stranger, unlike those with a cell phone.

2. Increases Stress Levels

The high frequency of cell phone use can have negative effects on our stress levels. Researchers found high mobile phone use was associated with stress and sleep disturbances for women, whereas high mobile phone use was associated with sleep disturbances and symptoms of depression in men. Overall, excessive cell phone use can be a risk factor for mental health issues in young adults.

3. Increases Risk Of Illnesses In Your Immune System

The incessant touching of your phone can harbor germs on your handset. The greasy, oily residue you may see on your cell phone after a day's use can contain more disease-prone germs than those found on a toilet seat. The results of the study showed that 92 percent of the cell phones sampled had bacteria on them — 82 percent of hands had bacteria — and 16 percent of cell phones and hands had E. Coli.

4. Increases Risk Of Eye Vision Problems

Staring at your mobile device can cause problems in your vision later in life. Screens on mobile devices tend to be smaller than computer screens, which means you are more likely to squint and strain your eyes while reading messages.

5. Cancer

Cell phones emit radiofrequency energy (radio waves), a form of non-ionizing radiation, from their antennas. Tissues nearest to the antenna can absorb this energy.

Advice to Prevent Utilising Device or Social Media Often:

1. Never use your phone as your alarm clock
2. Remove those excess apps
3. Don't bring your phone into the bedroom at all
4. Turn off (or customize) notifications
5. Keep the bathroom tech-free
6. Limit your usage with an app

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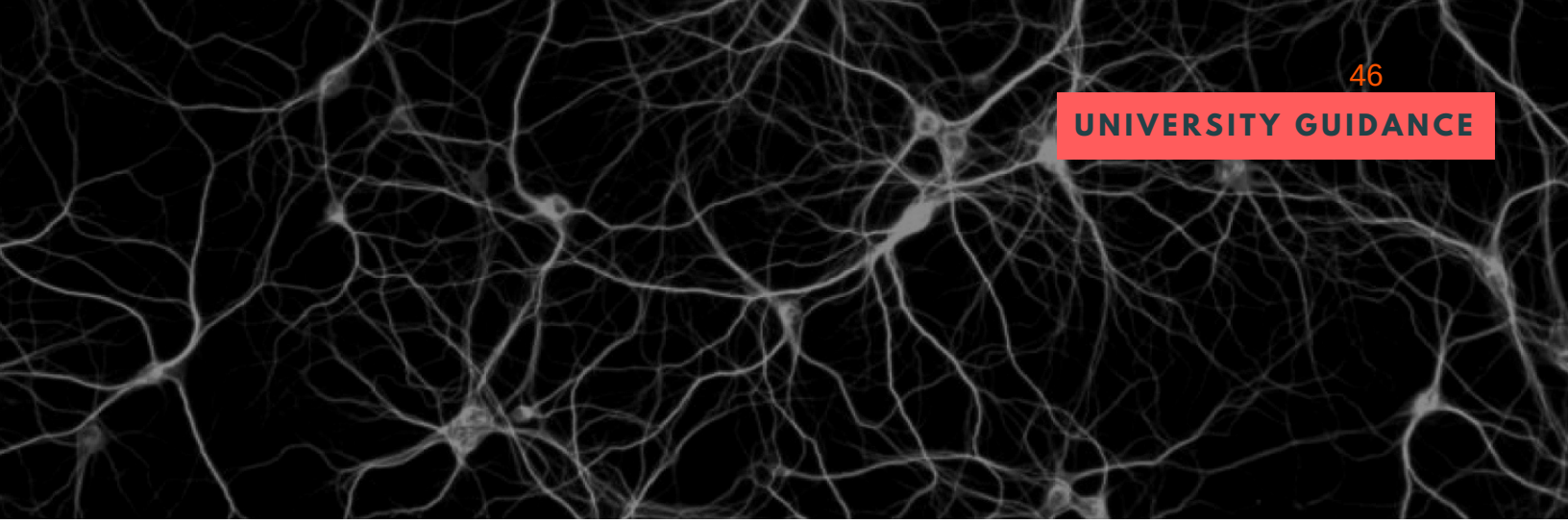
Reasons Why Applications are Rejected

By Elena Meganck

Most articles addressing the nerve-wracking process of personal statements mention something along the lines of: 'grammar and spelling errors are primary factors which mar an application', 'make sure you meet the requirements' or 'it's a shame such a great number of students submit incomplete applications, whether it's accidental or from a lack of information'. But these are blatantly obvious. Which less superficial reasoning causes the rejection of an application?

It's all in the name; 'personal statement'. Many students simply do not understand that the personal statement was not created to express your progressive achievements but rather for expressing your personal engagement and interest in the subject you want to study. Your personal statement is where you express your academic interests, why you want to study this particular course. It is where your reveal your aspirations.

There is a widespread misconception that universities look for the most 'well-rounded' students, defined as 'having a personality that is fully developed in all aspects'. This is not necessarily true. The university of Cambridge, for example, affirms it does not care for 'well-rounded' students; they look for students with a spiking interest in the course they are applying for. It's not of any use to write down all the activities, events and extracurriculars you have engaged in if they do not relate to the course or display an interest for it. The application of a student who aspires to study history will not benefit from the fact that she has played hockey since the age of twelve. A student who wishes to study natural sciences and has danced from the age of 12 would be at an advantage; she could relate her love of dance to her fascination of the human body. A personal statement is an opportunity for you to express your fascination in a specific area of study, not in all areas of study. The same goes for your peculiarities; expressing your personal quirks and individual traits makes universities gravitate towards you, but remember to keep them relevant to the course.



Understand exactly what the course is about. Go further than just taking a look at the course outline and scratch beneath the surface. Research what it's about in books, textbooks, newspapers, magazines, online journals, editorials, anything you can put your hands on. If you have been thinking about a certain subject to study at university and the thought of this being a tedious process floated through your mind when reading the previous sentence, then that subject is not for you. The research you invest in will not only make sure you're going for what's right for you but also show your genuine passion in the subject.

A Dean of admissions doesn't just look at whether the college is right for you. This is one of the most crucial aspects, as identifying whether a college suits you allows universities to tell whether or not they can help you reach your goals and benefit you. 'Make sure you're applying to the right college for the right reasons - you may be applying to schools which are just not appropriate for you and they're ultra competitive and really hard to get into. For many the golden letter of the admission is the end result - for me the red flag is when you end up in a school that's not right for you so if the level of selectively means it's not the best school for you make sure stay true to your own heart and apply to those school that can deliver on that', says the Eric Furda, Dean of Admission in the University of Pennsylvania. But most people know this. Less known is the fact that universities not only look for those students who can benefit from the facilities they offer, but they must also benefit the university community. Yes, you should emphasise on your skills and activities but they also want to know about your role in the college. As Seth Allen, Dean of Admissions and Financial Aid at Pomona College of California, explains it, 'it's not about being the best or having most superlatives but about who they are and then allowing us to make our best judgement as to whether they're a good fit for our community'.

Another reason why applications are rejected is when students express ingratitude. You might simply be wishing you got better test scores on your SAT or IGCSE, or that your maths teacher had been a better teacher, but it does not put forwards a good impression. To Janet Repelye, Deam of Admissions at Princeton, this is one of the most disappointing things: '[your personal statement] is not the moment to complain about your school or your teacher. Find the things that you're grateful for, find the things that are good and strong about you because that's what we want to know. What's good and strong and powerful about you.'

Lycée Français International de Hong Kong