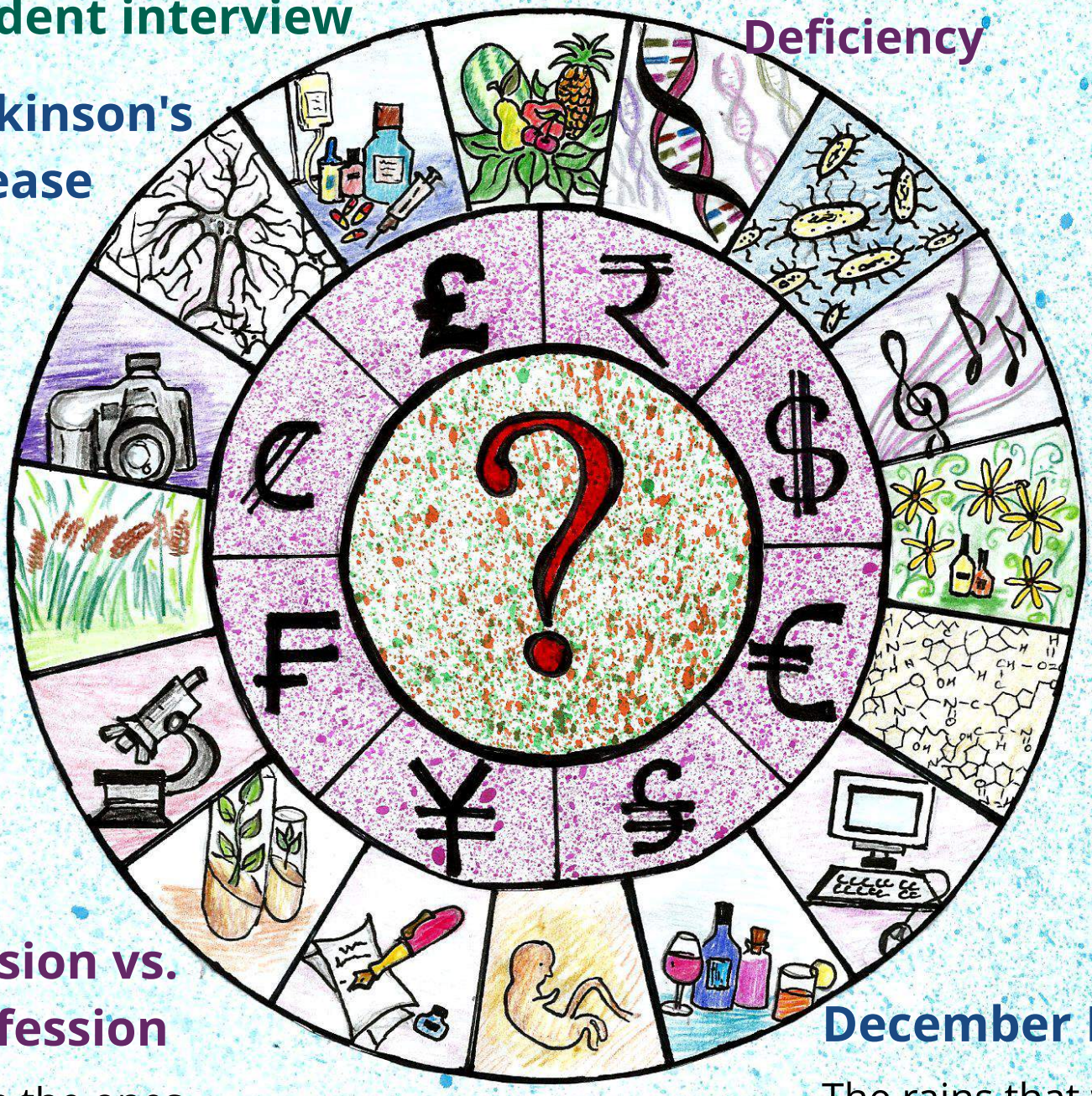
ANVESHNA

16.1

Adenosine Deaminase Deficiency

Student interview

Parkinson's disease



Passion vs. Profession

From the ones who've been there, done that!

December Floods

The rains that wrecked the city.

Scientific Writing Series

PARKINSON'S DISEASE

HARSHINI SRIDHARAN
B.TECH. BIOTECH. (SECOND YEAR)

Introduction:

Parkinson's disease (PD) is a chronic and progressive movement disorder. While the exact cause is unknown, it is proposed that a combination of environmental and genetic factors might trigger it. It is the second most common neurodegenerative disease and presently has no cure.

PD involves the malfunction and death of neurons in the brain, primarily affecting neuronal cell bodies concentrated in the substantia nigra, one of the regions of the brain that is involved in the production of dopamine. Dopamine is a chemical substance that sends signals to the part of the brain that controls movement and coordination. The level of dopamine in the brain decreases as the disease progresses and thus leaves the person incapable of controlling movement normally. The onset and the particular group of symptoms experienced may vary from person to person.

The primary motor symptoms include:

-tremor of the hands, arms, legs, jaw and face

-postural instability or impaired balance and coordination

-bradykinesia or slowness of movement

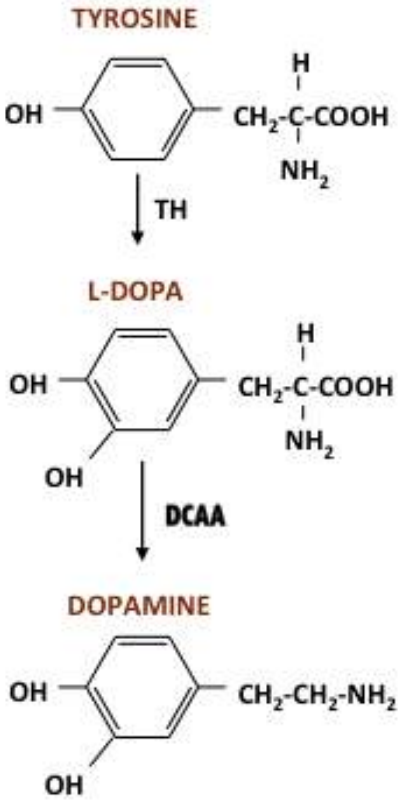
rigidity or stiffness of the limbs and trunk

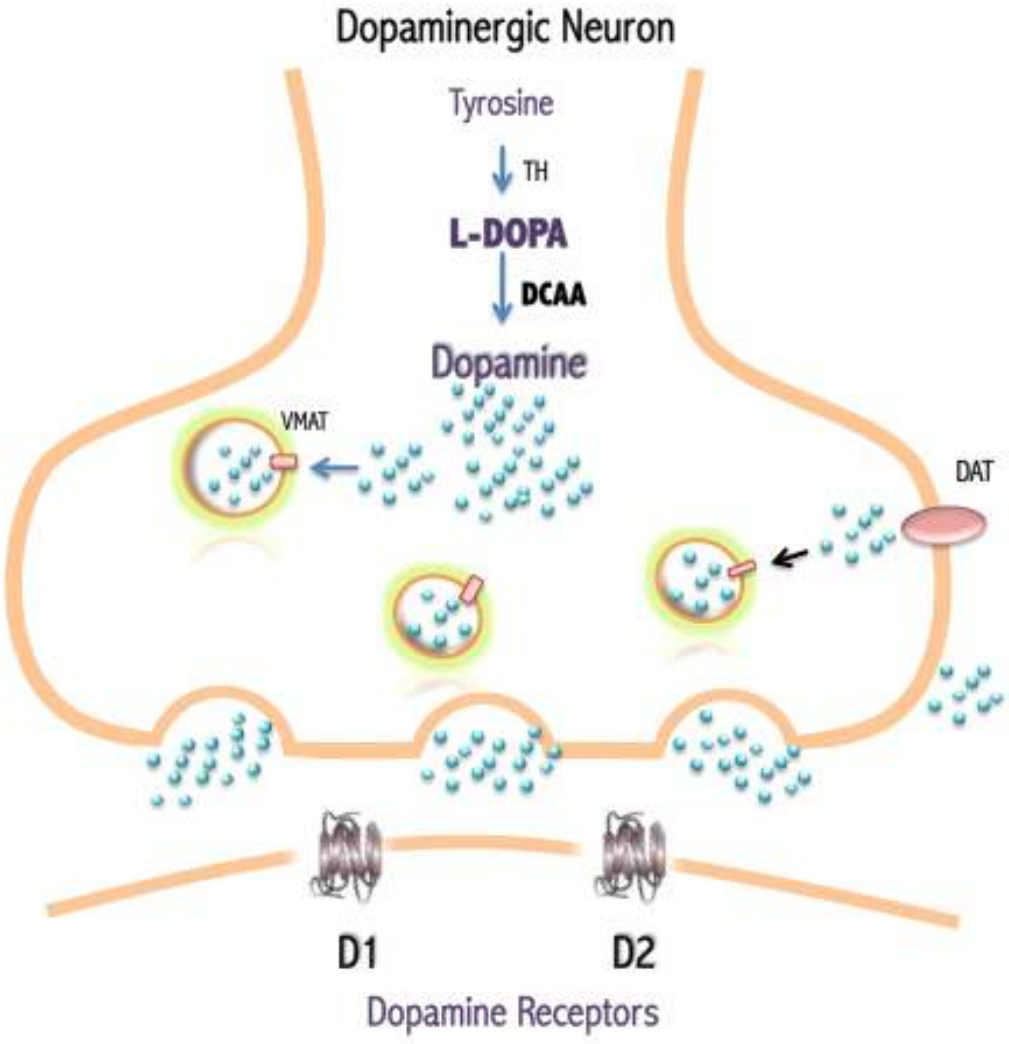
The hallmark of PD is the formation of clumps of a protein alpha-synuclein, more commonly referred to as Lewy bodies, that are found in the mid-brain, the brain stem and the olfactory bulb. These areas of the brain correlate to non-motor functions such as sense of smell and sleep regulation. The presence of Lewy bodies in these areas could explain the non-motor symptoms experienced by some people with PD before any motor sign of the disease appears. Although there is presently no cure, there are treatment options such as medication and surgery to manage its symptoms. The treatment options,however, do not help in the long run and are known to have side effects.In order to find a long-lasting treatment, it is vital that we first understand the disease.

Understanding Parkinsonism :

The key to managing and understanding Parkinsonism is to study the basis of it- dopamine. Dehydration of tyrosine to DOPA and its decarboxylation leads to the formation of dopamine.

Since reduced levels of dopamine causes motor and coordination problems, the existing treatment options target sites that produce more dopamine





*TH- Tyrosine hydroxylase **DCAA- Aromatic Amino Acid Decarboxylase

by regulating the enzyme responsible for increasing the level the of L-DOPA, its precursor.

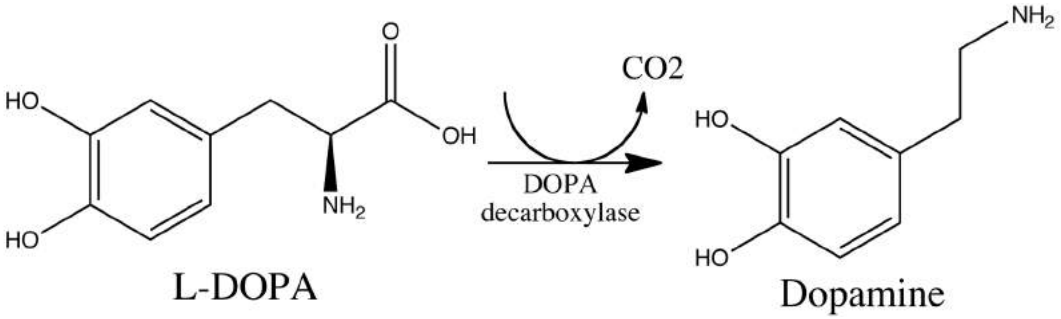
Treatment options:

Increasing L-DOPA levels:

In order to increase the amount of dopamine in the brain, dopamine cannot be introduced into the body as such, since it cannot pass the blood-brain barrier. Since its precursor L-DOPA can, drug treatments involve introducing L-DOPA into the body.

The conversion of L-DOPA or levodopa occurs both in the central and peripheral circulation. To prevent peripheral conversion of levodopa to dopamine and thereby reduce the unwanted peripheral side effects of levodopa, levodopa is usually administered in combination with carbidopa.

However, long term usage and over dosage of these drugs can lead to movement disorders, the very target that it is used to eliminate.



Stem cell therapy:

Stem cells are unspecialized cells that have ability to develop into almost any cell in the body. They are found in early embryos, foetuses, umbilical cords and also in some adult tissues.

These cells are studied thoroughly and intensely for PD research since they have the potential to grow into new nerve cells which could be used replace those lost in the patient's brain.

This treatment has not been made available for patients yet since there are several issues concerning its usage. The challenges of using stem cells include growing large quantities of dopamine-producing nerve cells and ensuring their survival. Researchers focus on finding out methods to put these stem cells to proper use so that its full potential can be tapped into, providing a viable cure to the patients.

Deep Brain Stimulation

Deep Brain Stimulation (DBS) is a surgical procedure used to treat disabling neurological symptoms of PD. DBS does not damage healthy brain tissue by destroying nerve cells, rather, it blocks electrical signals from targeted areas in the brain.

There are three brain targets that have been FDA-approved for use in Parkinson's disease. The most commonly utilized brain targets include the thalamus, the subthalamic nucleus (STN) and the globus pallidus interna (GPi).

The DBS system consists of three components:

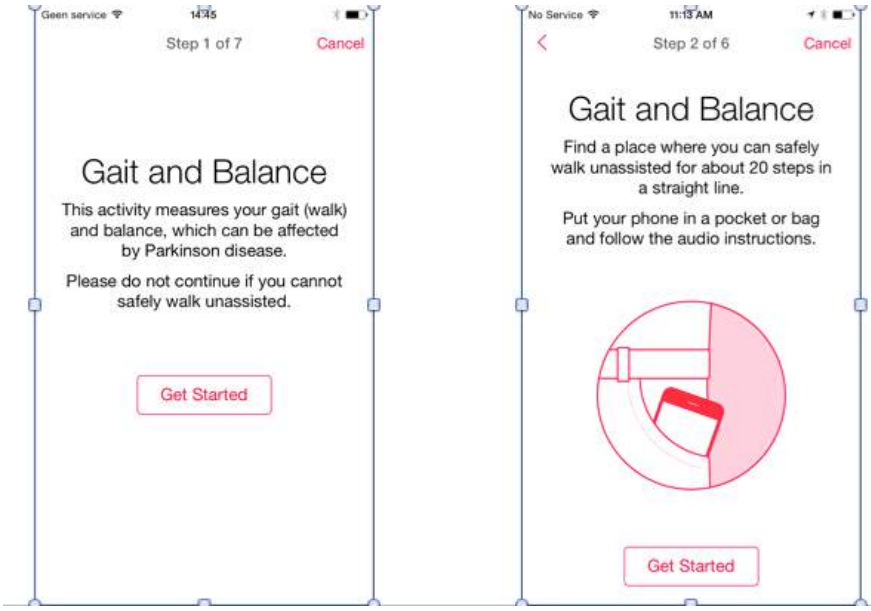
- The lead which is a thin, insulated wire inserted through a small opening in the skull and implanted in the brain. The tip of the electrode is positioned within the targeted brain area.
- The extension, an insulated wire that is passed under the skin of the head, neck, and shoulder, connecting the lead to the neurostimulator.
- The neurostimulator is the third component and is usually implanted under the skin near the collarbone. In some cases it may be implanted lower in the chest or under the skin over the abdomen.

Once the system is ready, electrical impulses are sent to the brain from the neurostimulator along the extension wire and the lead. These impulses block the electrical signals that cause PD symptoms by interfering with them.

Recent Research:

There is still a long way to go before a permanent cure can be obtained for this disease. This involves studying patients so as to understand the varying symptoms that manifest in patients.

One such way for patients to contribute to ongoing research is made available by Apple Inc.'s ResearchKit. Apple's iPhone is



used to track the progression of the disease among 9,500 people without direct contact between the researcher and the patient.

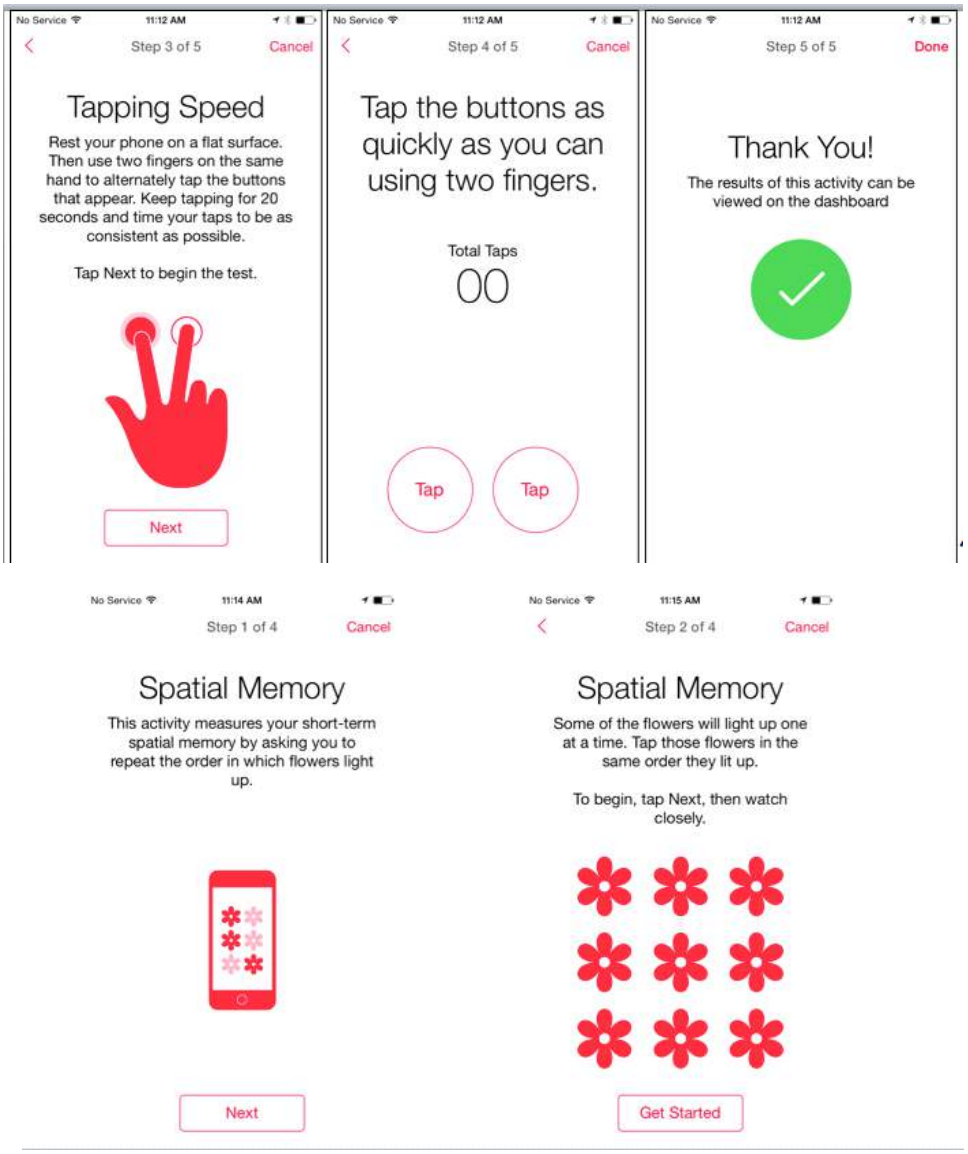
The study, conducted by non-profit medical research group Sage Bionetworks and Rochester Medical Centre with support from the Robert Wood Johnson Foundation, is one of the first big applications of Apple's ResearchKit, a set of software applications that make the iPhone a tool for medical research.

For researchers studying Parkinson's disease, gathering as much data as possible is vital to understand how to treat the symptoms of the disorder that affects nearly 7 million to 10 million people worldwide.

Participants involved in the study were asked to download an app which requires them to perform daily tasks that measured short-term memory, balance, even speech and dexterity.

All the actions performed were measured with the help of the iPhone's built-in sensors, such as its accelerometer, microphone and touchscreen.

Short-term spatial memory can be measured via activities performed in the mPower app.



Conclusions:

The human body is a complex machine. Understanding its issues and tackling them will require a lot of work and time but the effort we put in will pay off. The final result will help us get closer to understanding the diseases that cripple us, and maybe, might help uncover a lot more than we intend to.

References:

- Pdf.org. (2016). *Parkinson's Disease Foundation (PDF) - Hope through Research, Education and Advocacy*. [online] Available at: http://www.pdf.org/ [Accessed 10 Jun. 2016].
- Parkinsons.org.uk. (2016). *Parkinson's UK - Homepage*. [online] Available at: http://www.parkinsons.org.uk/ [Accessed 10 Jun. 2016].
- ninds.nih.gov. (2016). *National Institute of Neurological Disorders and Stroke*.[online] Available at: http://www.ninds.nih.gov/disorders/parkinsons_disease/parkinsons_disease.htm [Accessed 10 Jun. 2016]
- Sembulingam, K. and Sembulingam, P. (2012). *Essentials of Medical Physiology*. 6th ed. New Delhi: Jaypee, p.882.

THE DECEMBER RAINS

SRMByAG

Last December, Chennai fell victim to one of the worst natural calamities in nearly a century. What started innocuously as light showers, a respite to the residents of Chennai after a blazing summer, suddenly turned into a non-stop downpour the city was not equipped to handle. Within 24 hours, the city recorded nearly 49cm in rainfall.

SRM University wasn't spared from the havoc the rains wreaked in Chennai. Surrounded by lakes on all sides, the very location of our campus made it vulnerable to flooding.

Water gradually started filling out the ground floor to about knee length by afternoon, eventually flooding the hostels. Students were stranded as the floods blocked all routes out of campus.

The support staff at the University worked hard to keep the students safe during the disaster. They swam through waist-high water to the hostels, disregarding their safety, to provide students with food and water.

Besides helping the students on campus, the University reached out to those stranded on the highway, providing them shelter in the buildings within campus till the floods dissipated. Food, water and facilities to contact their loved ones were also provided.

The Indian Navy also stepped in, helping rescue stranded students and moving them to the University building. Day scholars and the SRMbyAG team constantly provided updates on the status of roads, trains and flights for stranded students trying to make it back home.

The rains may have caused immense material damage, but it couldn't sway the spirit of the Chennaites. Residents went beyond caste and creed to lend a helping hand to those in need.

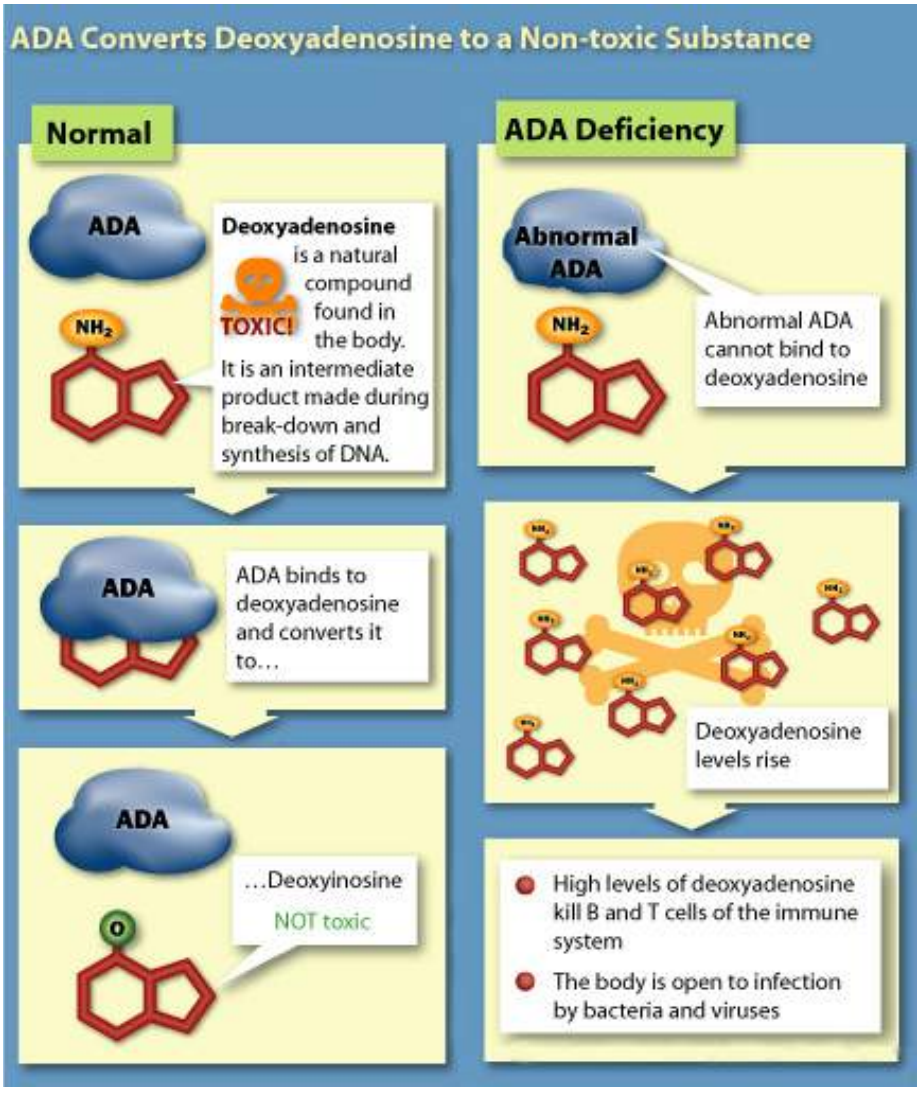
Photos: Mathangi Lakshmipathi

ADENOSINE DEAMINASE DEFICIENCY

R.KAUSHIKK
B.TECH.BIOTECH.(THIRD YEAR)

What is ADA Deficiency?

ADA deficiency is an inherited disorder that damages the immune system. It is one form of SCID (severe combined immunodeficiency), a disorder that affects the immune system characterised by severe immunodeficiency due to accumulation of purine derivatives - deoxyadenosine. ADA deficiency is rare, but very dangerous, because a malfunctioning immune system leaves the body open to infection from bacteria and viruses.



The disease is caused by a mutation in a gene on chromosome 20 that codes for the enzyme adenosine deaminase (ADA). Without this enzyme, the body is unable to break down a toxic substance called deoxyadenosine. The toxin builds up and destroys infection-fighting immune cells called T and B lymphocytes.

People with SCID virtually lack all immune protection from bacteria, viruses, and fungi. They are prone to repeated and persistent infections that can be very serious, even life-threatening. These infections are often caused by "opportunistic" organisms that usually do not cause illness in immunocompetent people.

How common is ADA deficiency?

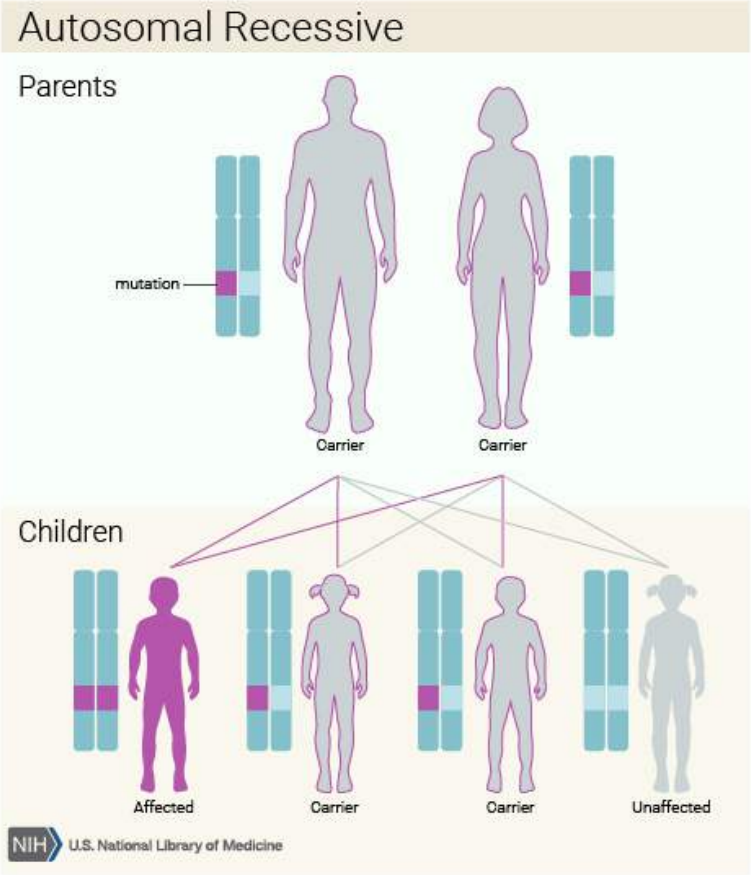
Adenosine deaminase deficiency is very rare and is estimated to occur in approximately 1 in 200,000 to 1,000,000 newborns worldwide. This disorder is responsible for approximately 15 percent of SCID cases.

What genes are related to ADA deficiency?

Adenosine deaminase deficiency is caused by mutations in the ADA-gene that codes for the enzyme adenosine deaminase. This enzyme is found throughout the body but is most active in lymphocytes. The function of ADA is to eliminate a molecule called deoxyadenosine, which is generated when DNA is broken down. ADA converts deoxyadenosine, which can be toxic to lymphocytes, to deoxyinosine that is not harmful. Mutations in the ADA-gene reduce or eliminate the activity of adenosine deaminase and allows the build up of deoxyadenosine to levels that are toxic to lymphocytes.

Immature lymphocytes in the thymus which have not yet undergone thymic selection are particularly vulnerable to deoxyadenosine. These cells die before they can mature to help fight infection. As a consequence, the number of lymphocytes in the thymus as well as other organs is significantly reduced. The person with the mutated ADA gene thus lacks infection fighting T cells and is prone to infections from organisms that are otherwise of no threat.

How does one inherit the deficiency?



ADA deficiency is an autosomal recessive disorder. A child can inherit the deficiency only if both parents are affected or at least carriers.

What are the symptoms of ADA deficiency?

Because ADA deficiency affects the immune system, people who have the disorder are more susceptible to all kinds of infections, particularly those of the skin, respiratory system, and gastrointestinal tract.

The main symptoms of ADA deficiency are pneumonia, chronic diarrhoea, and widespread skin rashes. Affected children also grow much more slowly than healthy children and some have developmental delay.

Most individuals with ADA deficiency are diagnosed with SCID. Sadly, most babies diagnosed with it do not live long. Onset of immune deficiency is delayed to between 6 and 24 months of age (delayed onset) or even until adulthood (late onset). Immune deficiency in these later-onset cases tends to be less severe, causing primarily recurrent upper respiratory and ear infections. Over time, affected individuals may develop chronic lung damage, malnutrition, and other health problems.

How do doctors diagnose ADA deficiency?

A small sample of the tissue from amniotic sac – Chorionic Villus Sampling – can be examined, or the levels of ADA can be estimated from the umbilical cord blood sample of the foetus, or from the blood of the newborn child.

Treatment options for ADA Deficiency

Like several diseases, there are no cures for ADA deficiency, but the usual treatment options focus on restoring ADA levels and improving immune system function, such as:

- Bone marrow transplantation,a procedure to replace damaged or destroyed bone marrow with healthy bone marrow stem cells from a biological match (for example, a sibling) to provide (precursors for) healthy immune cells
- Enzyme replacement therapy, involving repeated injections of the functional ADA enzyme to the patient
- Transfusions of red blood cells containing high levels of ADA from a healthy donor.

The drawback of these three treatment options is that they are not completely curative and the patient has to undergo these procedures quite frequently.

ADA deficiency patients are treated by injecting PEGylated bovine adenosine deaminase (ADA obtained from cows are modified by conjugation with polyethylene glycol). It was observed that the PEGylated ADA was rapidly absorbed after injection and with weekly doses, maintained the activity.

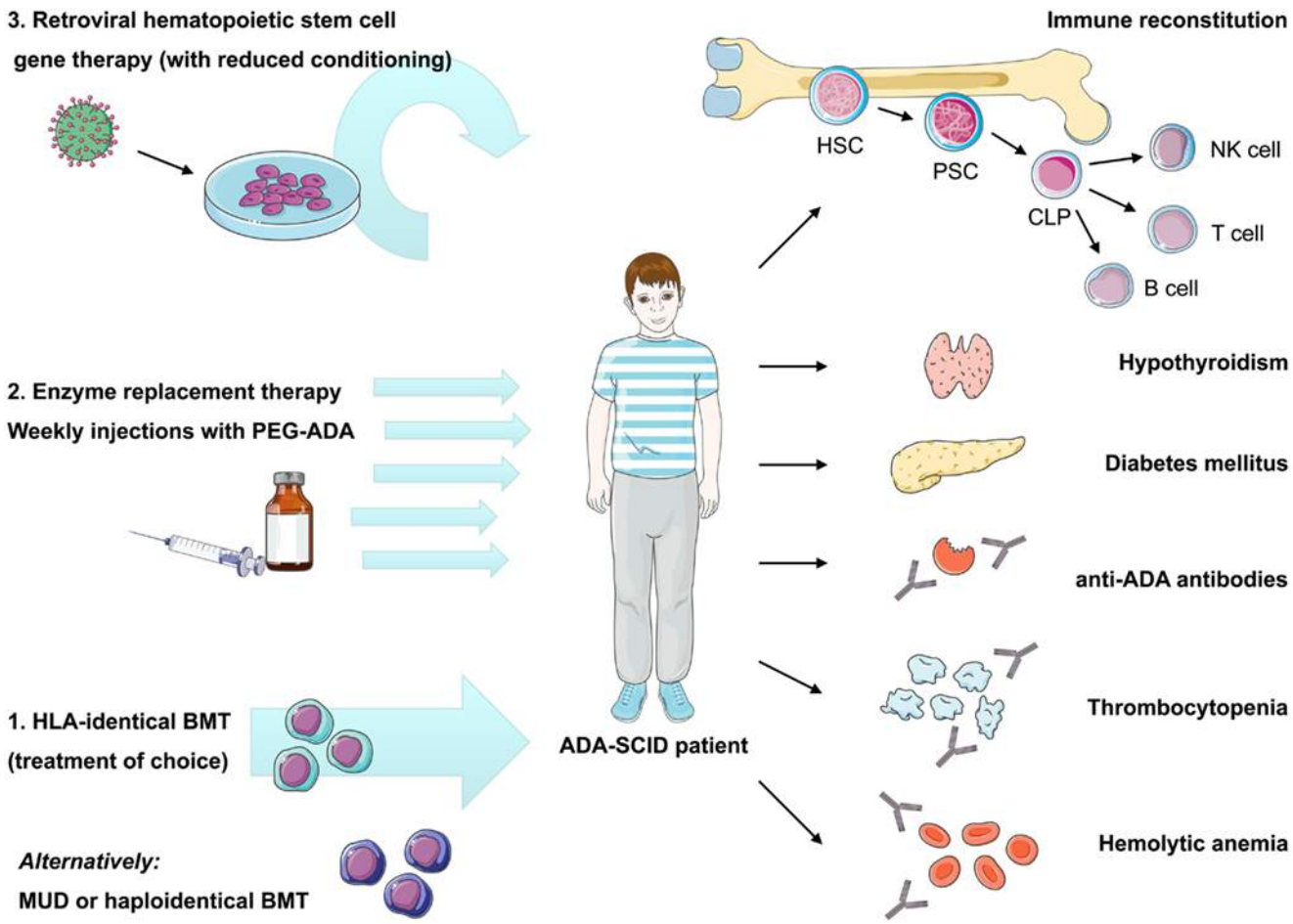
It was also observed that the deoxyadenosine nucleotides level decreased to less than 0.5 percent of total adenine nucleotides in red blood cells and no noxious side effects were observed. This was used as a replacement for transfusion of haematopoietic stem cells. This method was employed to treat a boy who was diagnosed with ADA deficiency when he was 4 month sold. He was administered PEG-ADA, and after regular doses for nearly 24 years, it resulted in near normalisation of his lymphocytes with very minor infections.

The most recent and successful treatment available currently is **Gene Therapy.**

Gene therapy is the therapeutic delivery of normal functional genes into a patient's cells using an adenovirus or retrovirus (vector) as a drug to treat diseases caused by improperly functioning genes or mutated genes. Gene therapy is a potential solution for genetic problem at its source.

Researchers are testing several approaches to gene therapy, including:

- Replacing a mutated gene that causes disease with a healthy copy of the gene.
- Inactivating, or "knocking out," a mutated gene that is functioning improperly.
- Introducing a new gene into the body to help fight a disease.



In 1990, doctors William French Anderson, Michael Biase, and Ken Culver performed the first successful gene therapy on a 4 year old girl, Ashanti de Silva, with ADA deficiency.

A synthetic functional ADA cDNA is then introduced into these lymphocytes (immune cells) cultured outside and is subsequently returned to the patient. If the treatment is successful, the new gene will make a functional protein to treat a disease. However, as these cells are not immortal, the patient requires periodic infusion of such genetically engineered lymphocytes. However, if the corrected ADA gene is introduced into cells at early embryonic stages, it could be a permanent cure.

Although PEG-ADA has long been used as a treatment option, many patients respond poorly to it. One such case was that of a child who showed poor response to PEG-ADA treatment. The PEG-ADA Enzyme replacement Therapy was discontinued. Autologous CD34+ cells were transduced with an ADA-expressing gammaretroviral vector and later infused into the child. Gammaretroviral vectors derived from the murine leukemia virus (MLV) are widely used to deliver therapeutic genes into human HSCs because of their capacity to integrate into the cell genome and their capability of self-replication.

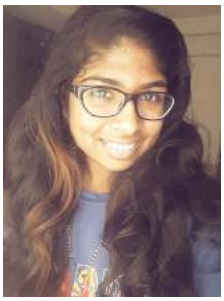
Conclusions:

ADA deficiency was once perceived as an incurable disease. With advancements in medical technology like gene therapy, it has become possible to rectify genetic abnormalities. The world has seen radical changes in the field of medicine and biotechnology; however, we come across a new hurdle every other day. It is in the hands of the future generation to come up with novel concepts to tackle every obstacle that comes our way.

References:

- Giblett, E., Anderson, J., Cohen, F., Pollara, B. and Meuwissen, H. (1972). Adenosime-deaminase Deficiency In Two Patients With Severely Impaired Cellular Immunity, *The Lancet*, 300(7786), pp.1067-1069.
- Bobby Gaspar, H. (2010). Bone Marrow Transplantation and Alternatives for Adenosine Deaminase Deficiency. *Immunology and Allergy Clinics of North America*, 30(2), pp.221-236.
- Kuo, C. and Kohn, D. (2016). Gene Therapy for the Treatment of Primary Immune Deficiencies. *Curr Allergy Asthma Rep*, 16(5).
- Aiuti, A., Cassani, B., Andolfi, G., Mirolo, M., Biasco, L., Recchia, A., Urbinati, F., Valacca, C., Scaramuzza, S., Aker, M., Slavin, S., Cazzola, M., Sartori, D., Ambrosi, A., Di Serio, C., Roncarolo, M., Mavilio, F. and Bordignon, C. (2007). Multilineage hematopoietic reconstitution without clonal selection in ADA-SCID patients treated with stem cell gene therapy. *Journal of Clinical Investigation*, 117(8), pp.2233-2240.
- Gaspar, H., Aiuti, A., Porta, F., Candotti, F., Hershfield, M. and Notarangelo, L. (2009). How I treat ADA deficiency. *Blood*, 114(17), pp.3524-3532.

BASICS OF SCIENTIFIC WRITING– PART I



GLANCIS LUZEENA RAJA
B.TECH. BIOTECH. (THIRD YEAR)

"If the reader is to grasp what the writer means, the writer must understand what the reader needs."

Being biotechnology students, we come up with new ideas every single day. As we explore avenues of research and innovation, it becomes essential to posses the skills to express these ideas. In order to stand out in the scientific community, one must understand the nuances of scientific writing. While most of us are well-versed in English, we tend to miss minute details that can significantly skew our intended message. Here are some of the things that one needs to look out for while writing scientific articles.

Where to use active and passive voice:

Writers tend to use passive voice more often than active voice. While stating that 'a' was affected by 'b' is passive, stating that 'b' does something to 'a' is active voice. Passive voice, while useful, can lead to complicated and vague sentences. Active voice, on the other hand, is more direct and gives the reader a clear picture of the idea the writer is trying to convey. What is important is for the writer to be aware of how he wants to convey his message and how the reader will perceive it.

Instances where passive voice is useful include:

- You wish your writing to be formal and depersonalised:

passive *It was agreed that the protocol should be...*

active *We agreed that the protocol should be...*

Present new information at the end of a sentence, or after providing sufficient context.

- Information about the agent is obvious or unimportant:

passive *Extra buffer was added to the flask*

active *The student added extra buffer to the flask*

- You do not know the identity of the agent:

passive *The pipe was broken in three places*

active *Something/someone had broken the pipe in three places*

Order of information:

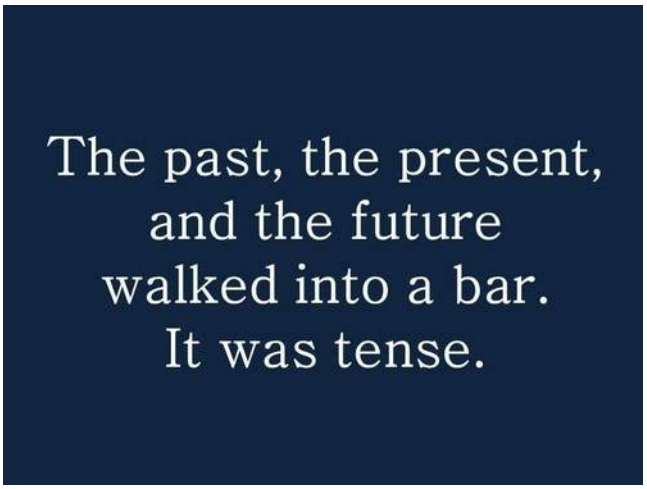
As important as it is to express ideas coherently, it is also vital to present it in an order that the reader finds easy to assimilate. For this, one must present old concepts first and then introduce new ideas. Old concepts refer to previous developments in a particular field. These provide the reader with some context before he is introduced to the new concept or hypothesis that the author is trying to present.

Pay attention to the usage of voice!

When one begins a sentence with new information, the reader may incorrectly try to link it with the previous sentence, making it even more difficult for them to process the information presented. Simple sentences are preferred to complex ones. Doing this too often might distort the original message the author intends to convey.

Therefore, one must reserve new information for the end of the sentence, or after presenting sufficient context for the same. This also helps the author to emphasize on the points he intends his readers to focus on.

Using tenses:



In most cases, past tense is used, since the author usually describes experiments that were conducted prior to the time of writing. However, using the past tense everywhere may not be appropriate. In many cases, one will have to combine different tenses in the same article.

For instance, the introduction to a passage may be in the past tense, as it states earlier developments in a particular field. What one concludes in the study will use the present tense and potential areas of research will use the future tense.

Take the following example:

"The experiment was carried out in a sterile environment (past tense).It is crucial to prevent contamination of the samples (present tense). For future experiments, it will be necessary to replicate the same conditions."

The proper usage of tense ensures the unambiguity of the article.

Use objective rather than subjective language:

Objective language is language that is impartial, stating a fact or process. Subjective language, as the name suggests, is open to question or interpretation.

Objective statement: The car travels at 35 kmph.

Subjective statement: The solution turned into a brilliant blue colour upon heating.

Rather than using language that expresses one's personal opinion, it is always better to use language that is more concrete and specific. When it comes to scientific writing, objective language is the way to go.

Sentence length:

Using the right number of words in a sentence can be tricky business. Make it too short and it becomes incomprehensible and irritating for the reader. Make it too long and it becomes very difficult for the reader to keep up. Most writers limit themselves to 20-25 words per sentence.

When it comes to sentence length-

Too long- your reader can't keep up

Too short- they get irritated!

If you find your sentence too long, here are some things you can do:

- Cut out unnecessary words.

-*Like* might replace *along the lines of*

-*Now* may be just as appropriate as *at the present time*

-*We can now turn our attention to* could perhaps be cut out entirely .

- Break down complex sentences into separate phrases or sentences :

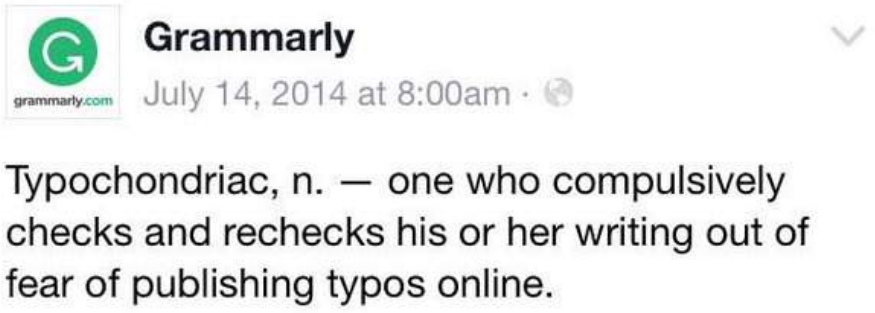
If a breakdown occurs it is important that alternative supplies are available and the way that this is done is for the power stations to be linked through the high voltage transmission lines so that all of them contribute to the total supply of energy and an unexpectedly large demand can be handled.

Restrict yourself to an average of 20-25 words per sentence.

The above-mentioned paragraph can be re-written as:

If a breakdown occurs it is important that alternative supplies are available; this is done by linking power stations through the high voltage transmission lines. All of them thus contribute to the total supply of energy and an unexpectedly large demand can be handled.

Doing research is just half of the picture. The rest, you can ignore if you choose to. Don't be surprised when readers draw their own conclusions. The essence of scientific discourse is not the mere presentation of experiments and results but rather actual communication – whether the majority of the reading audience accurately perceives what you have in mind. Scientific writing is crucial for a career in sciences.



Differentiation of the article from the reviews and books acts as the decisive factor during paper presentations and conferences as well. Writing a quality scientific paper is hence a key factor in one's career path.

Reference:

- www.le.ac.uk. (2016). *Writing for science — University of Leicester*. [online] Available at: http://www2.le.ac.uk/offices/ld/resources/writing/writing-resources/science [Accessed 8 April 2016].

In a day and age where everything is centered on marks and education has become more about the competition than actual learning, we tend to lose

PASSION VS. PROFESSION

Beyond the doors of the Bioengineering block...

ourselves in a vicious cycle, losing focus and falling into a mundane pattern, giving up on our individuality for the sake of professional security. Pressure to take something safe, to go down the beaten path is fast turning some of the brightest brains in our country to mindless drones sitting at a call centre somewhere in India. How does one find a balance between doing what he loves, while ensuring a good future for himself? We turn to our seniors, 'who've been there, done that and are still doing it', in a manner of speaking. Talking about their thoughts and plans at the time and how they came to the point they're at now gives an insight that we can take a cue from while planning our course about B.Tech. .

Despite going down different roads, there's a common message in all these articles- you are more than your grades. Don't let numbers on a transcript define you and your limits. Look beyond the curriculum to find your passion. Adding interest and dedication to the mix can help turn it into a viable profession.

JACOB ANTONY ALAPPATT

Project Assistant

National Brain Research Centre

Manesar, Haryana

S. VIGNESH

MS Neuroscience

University of Helsinki

Helsinki, Finland

THE ROAD LESS TRAVELLED

JACOB ANTONY ALAPPATT
(CLASS OF 2015)
MANESAR, INDIA

National Brain Research Centre

Unlike students in several other parts of the world, we live in an accelerated rat race. Exams haunt us from the time we learn how to read, and we are judged (for the most part) by our ability to score well. This mentality, coupled with our school education systems and their varying board exams may have its benefits. However, like many before us, we stick to this thought process –a ridiculous formula of grades over understanding our concepts.....and that tends to bite us in the gluteus when we attend college and start planning our careers!

"For a moment, leave aside your current GPA and let us think about what we are doing, and where we are going."

I was asked to write about how I managed to find a field that incorporated one of my passions-music, with research. Rather than follow through purely along those lines, I'd like to write about something that I think most of us can relate to.

It has been nearly a year since I left SRM and joined the National Brain Research Centre at Manesar, as a Project Assistant. My work involves deciphering an understanding of the cross-cultural perception of emotion through music. Quite a jump from Biotechnology, wouldn't you agree? And it is precisely this point that I wish to address. For a moment, leave aside your current GPA and let us think about what we are doing, and where we are going.

At the outset, I'd like to state that I don't mean to offend the current top rank holders, and those who focus on their grades! On the contrary, I'd like to share a few thoughts and opinions of my own.

When my batch joined SRM in 2011, many had told us to 'work hard' and secure a GPA above 9.0. Very few asked us to learn, and this is a critical point in my argument about our mentality towards education. If we, as a society, are going to brood about our grades and itty bitty numbers on a transcript, we aren't going to fare very well if we yearn to do some good in this world. If you're not 'learning' (in the true sense of the word), believe me when I say that some people truly 'give a damn' about your grades.

Our teachers warned us though, that by our third year, we would reach a stage where we would begin to panic about our future. Yes, they warned us, but we were just entering our college lives! A new level of freedom for most, a multi-cultural environment and plenty of new things to try out that we couldn't do in school. This was our wild child phase, and it is important that everyone goes through it. However, when we finally did reach our third year, the bitter reality of what lay ahead pretty much grabbed us by the throat and forced us to pay attention to what we were doing....well most of us at least!

Grades and assignments slowly started becoming less important as we realized we needed to join labs.

"If you're not 'learning' (in the true sense of the word), believe me when I say that some people truly 'give a damn' about your grades."

Exams became last minute preparations of mugging and vomiting words on paper as we realized that we had to spend more time stretching our imaginations to actually write our Statements of Purpose for college applications.

But wait. Our life had just been about tests. We knew how to handle tests. We knew what detailed answers to study for each exam. We knew what we could skip from the textbooks and slides and manage a decent grade. We knew that we could rely on short term memory to help see us through. These were our tools, our arsenal! Now they tell us that we have to show them things other than grades? How on earth do we do that when our syllabus just dictates that we need to pass a bunch of exams!?!

The rat race had changed.

It was a race to get into colleges, to get jobs, to get people to appreciate you as a person after reading up a sheet of facts and essays written by you.

Now, let's get some perspective here. Imagine you were working for an IT magnate, and you had to recruit the brightest minds for your company. Would you pick the kid with the best grades on his C.V., or the one who has part time work experience in coding? Would you pick the 9 pointer over the 7 pointer if the latter had app developing skills and exposure? I urge all of you to start thinking this way because this is a conversation I had with someone, and it changed the way I looked at my college education.

Maintaining an 8.0-8.5 CGPA was something I promised myself I would do, because I knew that grades did matter. But I also promised myself not to let them be my primary aim during my college years.

Luckily for me, I was blessed with parents who gave me the gift of music, and the opportunity to make decisions for myself- more often than not, ones that weren't very wise. But they helped me learn.

I played for several bands in Chennai, and started to teach music at a music school as a part time job on the weekends.

In fact, the SRM Music Club is a group that I'd have to thank for the opportunities to do things other than just attend classes and go home. Taking part in clubs and other activities enriches your mind, giving you new perspectives and ideas in all aspects of your life.

Music aside, I also began to explore what fields of research actually interested me. I experimented with Tissue Culture during one of my internships, and Viral Proteomics during another. Neither of these really did excite me much, so I tried my hand at Molecular Immunology. One thing I can honestly say is that *you can never figure out what you like to do, until you find some things that you truly can't see yourself doing*!

After working in wet labs, I realized that none of them really did get me going. I didn't mind doing it, but I really wanted to do something with music. As an artist, I was not particularly great, and knew I wouldn't make it as a musician. Yet, I knew and understood the impact music had on others and me. Moreover, I felt that I had the ability to use mathematical thinking (this isn't about math. Read 'Introduction to Mathematical Thinking' by Keith Devlin) if I had a good enough guide. Trying to combine these two, I came across a field I had never heard of-Cognitive Neuroscience of Music.

Using our dear friend Google, I began to learn a bit about the field and it electrified me like nothing had up until that point. I knew that no self-respecting university would accept a student who had no background in neuroscience to apply for a Masters in such a field. The internet though, being the remarkable tool that it is, helped me find a research centre in North India that had a lab which worked on this field, so I wrote to the Professor in charge.

I knew I had no work experience in this field, but I did have musical expertise and several minor stints at research as well. Dr. Singh, my current guide, kept writing back to me to see if I was 'interested' in the field. She explored my passions, my willingness to work hard and most importantly, my willingness to LEARN. I'm glad to say that I am now in her employ and I enjoy working here.

Our interests and hobbies need not be the things we do to ‘pass the time’; we have the power to channel them into something more meaningful, if only we look around and explore things other than just our transcripts.So start approaching labs outside the college for fresh fields of research that may interest you. Pay a trip to a few industrial plants and check out how things work there. You will never know what aspect of biotechnology truly inspires you if you don’t get out there and give things a shot. And perhaps of greatest importance, like my case, is that your degree doesn’t define your future.

"Our interests and hobbies need not be the things we do to ‘pass the time’; we have the power to channel them into something more meaningful, if only we look around and explore things other than just our transcripts."

The brain has a high degree of plasticity. It changes, making new connections with every experience you go through. And with these changes, comes a variation in your perspectives and your likes and dislikes. You may have joined up for a degree in biotechnology, but now fancy a profession more along the lines of theatre, management, psychology...maybe even quantum physics!

Nothing is stopping you from pursuing a Master’s degree in these fields after your B.Tech. as long as you make an effort to explore these avenues and gain a modicum of work experience while you are still pursuing your current degree. I may be working in the field of cognition right now, but I may make a switch to music therapy soon enough.

So stop being so rigid about grades. Put away those slides for a bit. Start exploring. Let your ideas evolve. After all, that’s what your brain is doing every day.

THE EXTRA LEAP

S. VIGNESH
(CLASS OF 2015)
HELSINKI, FINLAND

Every single person has this huge decision to make- whether to stick to what you're passionate about or choose a career that has a future and could be a viable profession in the long run.

But, if you ask me, I would say that both go hand in hand. As long as you love what you do, you'd still excel in it or at least get the satisfaction of trying harder to succeed in something you love doing.

This is how I've always decided about what I am to do with my life. I am currently pursuing my Master's degree in Neuroscience in the University of Helsinki. When I had to make the decision of taking up a career in research, I had to deal with a lot of demotivating remarks about the insecurities of the same, especially in Neuroscience, where the whole field is a one big system of chaos and people are still trying to find a pattern to make sense out of it.

But it never really bothered me because you just got to make one for yourself, and that's exactly what I am doing right now. I am doing my Master's degree and also pursuing my research in the field of neurotrophic factors in disease pathologies, so the future doesn't seem that bleak considering the experience I gain by doing all of this.

There is the question of choosing your specialization in research. The answer would seem to involve days and months of thinking and researching on the different specializations available. I would say that the situation I'd dealt a few years ago was a bit different, because I'd known for a long time that the only thing I wanted to specialize myself in was Neuroscience. It made things easier for me in a way that from the first year of the Bachelor's degree,

I focused more on widening my knowledge in the field of neuroscience, rather than researching on the different fields of specializations available. This helped greatly in the long term during the interviews and writing my statement of purpose, but I didn't know it would, back then.

"As long as you love what you do, you'd still excel in it or at least get the satisfaction of trying harder to succeed in something you love

This is quite important for any person who would plan on going through a major shift from the field of biotechnology to something very different, like that of neuroscience.

Once you've chosen the field you'd want to specialize in, begin to look for the place you'd want to go study in. Europe was a viable option for my master's due to the kind of neuroscience research that happens in the universities, which caters to my needs. And let's just say that subconsciously, I loved the idea of studying in Europe, where there is more diversity in terms of culture, the kind of inter-personal skills you'd develop over the period of two years and the prospect of travelling to European countries.

One suggestion would be to choose universities based on the research going on there and not solely based on the ranking system because, we're doing our master's degree and the research that you do in the course of these two years would decide the fate of your career in the future.

"Choose universities based on the research going on there and not solely based on the ranking system."

University of Helsinki

But then again, this is just my perspective and it differs from one person to another. Also, this doesn't mean that you choose a university that's really low in ranking, but to find a balance of decently ranked universities where the research is good and the funding for the research is amazing and is stable in the years to come.

Once you've decided where you'd apply, all that's left is to prepare accordingly and get through your entrance exams- GRE, IELTS/TOEFL.

Prepare yourself with a decent profile (Grades), letter of recommendations from professors that you've worked with and who know you well enough to write one and would help your profile in terms of a character reference.

Beyond this, there is nothing left to do but to make sure that the applications are being done within the timeline and just wait, hoping that you'd get through.

I know for a fact that this works and there is lot more to learn than just the 4 years of a bachelors, something that I have come to realize in these 6 months of working in a laboratory and this phase of learning would actually provide you with a level of satisfaction of doing sticking to what you're passionate about.

To conclude, the point I'd suggest, stick to the field you love the most and you're passionate about, irrespective of how "bright" the future is.

The future is what you make for yourself-when you love the things you do, you'd work harder and take the extra leap to make sure that you succeed in it.

STUDENT INTERVIEW

AS TOLD TO MATHANGI LAKSHMIPATHI
B.TECH. BIOTECH. (THIRD YEAR)

Photography is the art of observation. It has little to do with the things you see, but everything to do with the way you see them. Here is an excerpt from the conversation we had with Hrishikesh, 4th year, B. Tech. Biotechnology.

Mathangi:Who/What got you started in photography?

Hrishikesh: Frankly, It was my parents. I think it started from childhood where my parents took me to hill stations during my vacation times and I used to be the one who clicks photographs of them and the surroundings. But during that time, having a camera in hand made me look at it as a toy more than a tool to shape myself. I really had fun clicking but never did realize I could make this my hobby. I used to waste a lot of time watching movies and TV shows and my parents were clearly not happy. Of course, whose parents will? My dad desperately wanted me to get out of the house do something useful in life.

That's when I started thinking of a nice hobby to start with; I used to be good at drawing when I was kid but that habit/hobby fell out due to unfamiliar reasons. I thought of being a guitarist and going to classes but it was rather unclear on what I wanted. Until one day, after college I noticed the sunset as I walked along the lake, that moment I just took out my phone and clicked a picture of it. I didn't care about the quality. I felt rather happy about it. That's when I started to think about getting into photography.

Of course it was way more complicated than a simple thought. I started to follow a lot of pages on social media and some of my friends who had photography as their hobby; and after a month or two shooting with my phone and following the media, I realized I liked clicking pictures. So, the next step was to buy a decent camera. My initial thought was to get a second hand DSLR but when I asked my dad, he refused. It was in Bangalore when my father decided to get me a DSLR, which, of course, took me by surprise. So I'd say that what got me started in photography was my parent's faith and my interest to take photography as my hobby.

M: How would you describe your style of photography?

H: I'm yet to find my style in photography; some of the pictures that I had clicked are inspired from my mentors who I follow on social media. I initially started with nature. Clicking pictures of birds were one of my first ways of learning on how to capture something that won't listen to you, or should I say learning patience?

For about a year I learned a lot about birds in south India specifically in Chennai and photographed some of rare species here. A year later, I got my third lens (50mm) which is basically a portrait lens. I had never explored streets since my focus was just with bird photography, but one day I decided to mingle with the crowd to see if I

could capture emotions or moments in a busy street. Initially I was nervous but once I started interacting, i started getting some nice shots which shifted my focus to people (candid photography, street photography). My first street photography started in T -Nagar market and slowly to Marina, Parry's corner etc. I haven't explored much, my trips are short and I'm yet to learn and travel around to know what my style is. Style doesn't come on its own, it comes by exploring yourself.

M:What gives you ideas to create such imagery?

H: I've never really had a particular idea to click a perfect shot; a perfect shot comes to you when you are at the right place at the right time. You never know when it's going to happen and that's the beauty of it. There are perfect moments happening everywhere, it's just that the photographer should look for it, be patient and capture it as it comes to him. Whatever good shots I had clicked are a matter of luck and patience, there are quite a few good shots where I had to be really patient to get them and there are moments that I have missed unintentionally and deliberately which happens 50 to 60% of the time in my case. So a perfect shot clearly depends upon the time and sometimes luck.

M: Could you list a few of your memorable incidents?

H: I have been to a lot of photo walks and in each and every one of them lies a memorable incident. If I have to be really specific, I have this shot of 3 kids hugging each other and laughing as if they were the happiest people in the world and clearly that shot is magical to me because the shot is purely candid, I didn't tell them to do anything except telling them that I needed a picture of them. In the next 2 minutes, I clicked 10 photographs to get one perfect shot ,and I did get one. That shot is a special one because it helps me during situations where I'm down and that one picture is enough for me to raise my spirits.

M: Would you take up photography as a career? Why/ why not?

H: Well, absolutely not. For me, Taking up photography as a hobby/passion is much more fruitful than taking it as a career. Photography in terms of a career is rather costly and difficult in terms of making money. Today, cameras have become so sophisticated that people require amazing photographs from the concerned services , and in order to get amazing photographs, one has to practice a lot to master the art.

Moreover, it takes a lot of time and luck in terms of recognition and when there is proper recognition, money making won't be problem but photography won't be enjoyed as much as being passionate about it. This is my perception on taking photography as my career.

M: Whom have you learnt the most from?

H: Can the answer be – Infinite? It's a very honest answer. I see amazing pictures every day and get all the more inspired.

M: Photographers who inspired you?

H: Ashok Saravanan, Mahesh Balasubramanian , Steve Mc Curry, Manish Mamtani, Jayanta Roy etc.

M: What are misconceptions in photography?

H: Some people think photography is easy, they think it's all about you holding the shutter and when the time comes you capture. Well, it's a lot more complicated than that. Photography is like a poem. When you read a poem, you feel about it, it takes you to the heart. Here, a photographer is a poet as he tries to make a poem as he clicks. Tell me; is it easy to become a poet? This is the first misconception- not understanding what photography is. Second, does having a professional camera make you a better photographer? It doesn't, since photography is an art, acquired through practice and enhancing your skill. The camera is just a tool to help you click but it's the way you see that determines the creativity in your picture.

Thirdly, there have been many instances photographers don't get paid for what they deserve, some people want it for free and some people think it's costly. The answer is you pay for what you get and a photographer captures the rare beautiful moments that come out from a being, Using professional equipment and processing to make sure the picture is full of happiness is something that comes from luck and a lot of hard work. So pay for it.

Fourth, competitions that are conducted based on likes for publicity saddens me deeply since photography is used to make publicity for an organization or an institution than display talent. What's even more shocking is that a somewhat mediocre picture can easily win a competition without as much effort as other pictures with potential, which can instantly degrade a photographer's motivation.

ANVESHNA– THE TIMES AHEAD
A PERSONAL STATEMENT

RAGHAV GURURANJAN, SANJAY.N
B.TECH. BIOTECH. (CLASS OF 2016)

Hi All!

Unlike all the other instructional letters that you usually receive, this letter is more of an informal appeal by 2 students who would like to

share with you, a small portion of their journey these past 4 years. It would've been easier just to gather you folks up and talk to you about it but something about written words just seemed permanent. You would've guessed from the subject tag what this whole thing is all about. Yes. Anveshna.

Most of you currently may not comprehend the significance of this topic and some of you may not even know what Anveshna is, but that is what this statement of ours will attempt to answer. So starting in the second year when everything was all about guide books, scores and technical internships, there was little room for people to be anything else but academically competent. Although our department was and is host to a multitude of talents there was never really any space for those capacities to breathe. It was this kind of situation that we found ourselves in and we were sure that we could perform folds better in exams if we could find time to discover new things and look through the peep hole.

That was when we were told about a Biotech Students Association called Anveshna that catered to empowering students both practically and imaginatively. This sounds good on paper but does Anveshna really live up to that expectation?

Since having asked that question, it has been 2.5 years of nothing but resounding constructive fun.

Moreover, it brings us immense joy to hear so many good things being said about Anveshna this past year and how it has expanded. We truly hope this trend continues.

It has been only a few years since this association began and we are still in the process of discovering Anveshna's potential. We would like to share a little bit about what we discovered, and our interpretation of Anveshna:

i. Firstly, we would like to point out that the association is a privilege for students given that the department by itself does not stand to make many gains here. It is in fact a strain on its resources. So we must understand that a lot of extra time goes into this from the other side as a result of a good heart and we must make the best use of it.

We are still in the process of discovering Anveshna's potential.

ii. Charity starts at home. One of Anveshna's goals in our mind is bringing people together and instilling harmony amongst students and teaching us to have each other's back. So before many of us start thinking BIG like starting an NGO or thinking larger than life community based concepts (which are not bad things), we suggest that we start by first helping ourselves out. Embracing the department as yours goes a long way in changing one's attitude be it picking up trash lying on the corridors, wiping down scribbling on walls or policing your friends from doing rash things.

Charity starts at home.

If you wish to see something change, make an attempt to change it and create the environment that you would like to see. We assure you Anveshna gives you that power.

iii. The activities undertaken by the association need not be fancy, loud and branded but can be leaning towards small yet thoughtful ones. Most great initiatives have humble origins and to us, Anveshna was learning how to get a message across to students by the simplest of means.

As a corollary of this, it is important that we constantly innovate. Break the dogmas and make the uncommon common. With a department as dynamic as ours that is very easy to come by but materializing these thoughts is a whole new ball game, which leads us to our next point.

Innovate. Break the dogmas and make the uncommon common.

iv. See all ideas through to the end. This was something we failed at most often. Ideas see the light of day only if executed thoroughly and one can't claim the fruits of one's labor with just words on paper. The most exciting part about this whole endeavor is that every year things are different based on the people involved. Yes. Anveshna is yours to interpret!! Every person sees the world through different shards of glass. So why exactly do you have to listen to what we have to say? The truth is you don't have to and we have no right to say this is the best approach to encourage student growth in the department but as we have mentioned, this is a personal statement. At the end of the day, what is important is that our students benefit first from the activities that are undertaken and we remain close knit all through it. Imagine a department where everyone knows everybody else and through arduous collaboration we end up learning what everyone else has to offer?

See all ideas through to the end.

v. Connect amongst years is important in maintaining a flow of annual contribution to the associations agenda and no one must ever be marooned. To this regard, every senior involved must understand that the true bulk of Anveshna's innovative force lies with the juniors and their involvement and early understanding is crucial to the success of everything that goes on.

Anveshna is yours to interpret!!

vi. Do not be shy about your capabilities. It is often the case where we expect people to give us cues and applause for us to come forward and contribute. Understand that we only have ourselves to realize our role and looking for validation is a wasteful action. If you think you excel at something, that's all that Anveshna needs. So do come forward and be bold about how you would like to contribute. These simple actions of self-initiation will go a long way in helping the association progress.

vii. If you have really had the patience to read through all the points of this long drawn letter then congratulations! This is the final point. We now have a bonus piece of information for you.

Do not be shy about your capabilities

Fortunately/Unfortunately, humans are a communal species and we rely on each other directly/indirectly to see our dreams through. Therefore, it is vital that we know how to communicate our thoughts to others in an assertive manner. This is not to say we have those skills but all we can say is we have seen great improvement and increased levels of confidence after these four years. Yes.

One of the biggest pros in an endeavor with only pros is, it gives you the much needed people skills to put your thoughts on the map.

Humans are a communal species and we rely on each other directly/indirectly to see our dreams through.

It truly has been an awesome experience for the two of us and all of the people who have worked with us and we are delighted to have forged evergreen bonds with so many like-minded people and I am sure this association will continue to keep giving. Keep the spirit up and thanks to everyone for having supported this cause in whichever small way they have! For those who are just coming across Anveshna and are intrigued by it, we have attached a list of office bearers and their contact details. Don't shy away from giving any of us a call.

Cheers!

ANVESHNA- OFFICE BEARERS

Newsletter coordinators

Glancis Luzeena Raja (Third Year)
Email- lancisluzeena_raja@srmuiv.edu.in
Mob - 9566149736

Mathangi Lakshmipathi (Third Year)
Email-mathangil_lakshmipathim@srmuiv.edu.in
Mob - 9940080900

Event Management coordinators

Vinod N (Fourth Year)
Email- vinod_narasimhan@srmuiv.edu.in
Mob- 9962604363

Al Ameen (Third Year)
Email- alameen_sikkanear@srmuiv.edu.in
Mob - 9677209163

General Administration

Gokul.Ravichandran (Fourth Year)
Email- gokul_ravichandran@srmuiv.edu.in
Mob - 7845564729

Malvika (Third Year)
Email- malvika_nanda@srmuiv.edu.in
Mob -9551258295

Publicity

Mukund Khandelwal (Fourth Year)
Email- mukund_khandelwal@srmuiv.edu.in
Mob - 9962750335

Arun Kumar (Third Year)
Email- sarunkumar_subramania@srmuniv.edu.in
Mob - 8390360227

Social Activity

Himanshu Jain (Third Year)
Email- himanshu_kumar@srmuiv.edu.in
Mob - 9176178323

Shreya Anil Kumar (Third Year)
Email- shreya_kumar@srmuniv.edu.in
Mob - 7358320502

Corporate Connect

Abishek Ariwala (Third Year)
Email- abhishek_ariwala@srmuniv.edu.in
Mob - 9884287340

Music Club

Harsha Shrihari Rao (Third Year)
Email-harsharao_shrihari@srmuniv.edu.in
Mob - 9445170233

VISION

Anveshna aims to bring out the skills and talents students possess, channel their creative energies and be an outlet of expression and discussion. By enhancing interaction among students through department activities, we aim to improve the learning atmosphere and knowledge about current trends in the field of Biotechnology.

STUDENT EDITORS

Glancis Luzeena Raja (B.Tech. Biotech., Third Year)

Mathangi Lakshmipathi (B.Tech. Biotech., Third Year)

COVER DESIGN

Jocelyn Cleta (B.Tech. Biotech., Third Year)

EDITORIAL REVIEW

Dr.S. ThyagaRajan (Professor, Biotech.)

Dr. D.V.L. Sarada (Assistant Professor, Biotech.)