

# VVP ENGINEERING COLLEGE RAJKOT

## BIOTECHNOLOGY ENGINEERING DEPARTMENT



### E-Bulletin

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# Vision

*The Bio-Technology Engineering Department tenders a distinctive identity in upgrading the laboratory infrastructure and course content to match the pace with the recent advancements and milestones achieved in the field. The vision of the Department is to enhance learning environment, secure learning outcomes and instil research mind-set amongst the students. The cohesive and cooperative team of well-experienced faculties provides all the necessary and required guidance and encouragement to the students to make them creative, innovative and competent professionals in the field of Bio-Technology Engineering.*

# Mission

*The mission of Bio-Technology Engineering Department includes:*

- ❖ To provide the country world-class Biotechnology Engineers.*
- ❖ To enable the students to take up practical challenges.*
- ❖ To provide the students value-based and relevant education in the field of Biotechnology Engineering.*
- ❖ To identify, explore and nurture the inherent potential of our students for serving the country in a better way.*
- ❖ To make the students achieve their career ambitions and life goals.*

**Note:** Vision & Mission as conceptualized and composed by **Dr. Sumit Kumar**

# HUMANS and SNPs

Prof. Dharmadh H. Sur

Head-Biotechnology

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The comparison between genome sequences of different organisms of the same species or from a different species show that these are not static but change or mutate over their evolutionary history. Changes or mutations in a genome can occur due to a variety of causes such as errors in DNA replication or external factors like UV rays. These changes or mutations may be **neutral, defective or advantageous** for adaptation, survival and reproduction of the relevant body. If a mutation occurs in the **germline** of an organism can be transmitted to their descendants. Thus a mutation that is neutral or advantageous for the reproduction of an organism can spread in a population and resulting fixed polymorphisms. A **polymorphism** is the existence of different variants of a DNA sequence called **alleles**.

The most frequent polymorphisms are **SNPs**, single nucleotide polymorphisms. These variations consist of a single nucleotide change by another between alleles. The **STR**, short tandem repeats, are the second most frequent polymorphisms. This consists of repeating a different number of times in different alleles of short sequences of DNA. Finally, **indels, transpositions, inversions and duplications** may appear as polymorphisms rarely.

A **Single Nucleotide Polymorphism**, also known as **Simple Nucleotide Polymorphism**, (**SNP**, pronounced *snip*; plural *snips*) is a DNA sequence variation occurring commonly within a population (e.g. 1%) in which a single nucleotide — A, T, C or G — in the genome (or other shared sequence) differs between members of a biological species or paired chromosomes. For example, two sequenced DNA fragments from different individuals, AAGCCTA to AAGCTTA, contain a difference in a single nucleotide. In this case we say that there are two *alleles*. Almost all common SNPs have only two alleles. The genomic distribution of SNPs is not homogenous; SNPs occur in non-coding regions more frequently than in coding regions or, in general, where natural selection is acting and 'fixing' the allele (eliminating other variants) of the SNP that constitutes the most favorable genetic adaptation. Other factors, like genetic recombination and mutation rate, can also determine SNP density.

SNP density can be predicted by the presence of microsatellites: AT microsatellites in particular are potent predictors of SNP density, with long (AT)(n) repeat tracts tending to be found in regions of significantly reduced SNP density and low GC content.

Within a population, SNPs can be assigned a minor allele frequency — the lowest allele frequency at a locus that is observed in a particular population. This is simply the lesser of the two allele frequencies for single-nucleotide polymorphisms. There are variations between human populations, so a SNP allele that is common in one geographical or ethnic group may be much rarer in another.

These genetic variations between individuals (particularly in non-coding parts of the genome) are sometimes exploited in DNA fingerprinting, which is used in forensic science. Also, these genetic variations underlie differences in our susceptibility to disease. The severity of illness and the way our body responds to treatments are also manifestations of genetic variations. For example, a single base mutation in the APOE (apolipoprotein E) gene is associated with a higher risk for Alzheimer disease.

## **Types**

Single-nucleotide polymorphisms may fall within coding sequences of genes, non-coding regions of genes, or in the intergenic regions (regions between genes). SNPs within a coding sequence do not necessarily change the amino acid sequence of the protein that is produced, due to degeneracy of the genetic code.

SNPs in the coding region are of two types, synonymous and nonsynonymous SNPs. Synonymous SNPs do not affect the protein sequence while nonsynonymous SNPs change the amino acid sequence of protein. The nonsynonymous SNPs are of two types: missense and nonsense.

SNPs that are not in protein-coding regions may still affect gene splicing, transcription factor binding, messenger RNA degradation, or the sequence of non-coding RNA. Gene expression affected by this type of SNP is referred to as an e SNP (expression SNP) and may be upstream or downstream from the gene.

## **Use and importance**

Variations in the DNA sequences of humans can affect how humans develop diseases and respond to pathogens, chemicals, drugs, vaccines, and other agents. SNPs are also critical for personalized medicine. However, their greatest importance in biomedical research is for comparing regions of the genome between cohorts (such as with matched cohorts with and without a disease) in genome-wide association studies.

The study of SNPs is also important in crop and livestock breeding programs. See SNP genotyping for details on the various methods used to identify SNPs.

SNPs are usually biallelic and thus easily assayed. A single SNP may cause a Mendelian disease. For complex diseases, SNPs do not usually function individually, rather, they work in coordination with other SNPs to manifest a disease condition as has been seen in Osteoporosis.

As of 8 June 2015, dbSNP listed 149,735,377 SNPs in humans.

SNPs have been used in genome-wide association studies (GWAS), e.g. as high-resolution markers in gene mapping related to diseases or normal traits. The knowledge of SNPs will help in understanding pharmacokinetics (PK) or pharmacodynamics, i.e. how drugs act in individuals with different genetic variants. A wide range of human diseases, e.g. sickle-cell anemia,  $\beta$ -thalassemia and cystic fibrosis result from SNPs. Diseases with different SNPs

may become relevant pharmacogenomic targets for drug therapy. Some SNPs are associated with the metabolism of different drugs.

SNPs without an observable impact on the phenotype (so called silent mutations) are still useful as genetic markers in genome-wide association studies, because of their quantity and the stable inheritance over generations.

**On the other site, all types of SNPs can have observable phenotype or can result in disease:**

- SNPs in non-coding regions can manifest in higher risk of cancer.
- SNPs in coding regions:
  - synonymous substitutions by the definition do not trigger amino acid change in the protein, but still can affect its function e.g. seemingly silent mutation in the multidrug resistance gene 1 (MDR1), which codes for a cellular membrane pump that expels drugs from the cell, can slow down translation to allow the peptide chain to fold into an unusual conformation causing the mutant pump be less functional
  - nonsynonymous substitutions:
    - missense - single change in the base results in change in amino acid of protein and its malfunction which leads to disease (e.g. c.1580G>T SNP in LMNA gene - position 1580 (nt) in the DNA sequence (CGT codon) causing the guanine to be replaced with the thymine, yielding CTT codon in the DNA sequence, results at the protein level in the replacement of the arginine by the leucine in the position 527, at phenotype level this manifest with overlapping mandibuloacral dysplasia and progeria syndrome)
    - nonsense - point mutation in a sequence of DNA that results in a premature stop codon, or a *nonsense codon* in the transcribed mRNA, and in a truncated, incomplete, and usually nonfunctional protein product (e.g. Cystic fibrosis caused by the G542X mutation in the cystic fibrosis transmembrane conductance regulator gene).

**Analytical methods to discover novel SNPs and detect known SNPs include:**

- DNA sequencing;
- capillary electrophoresis; mass spectrometry;
- single-strand conformation polymorphism (SSCP);
- single-base extension;
- electrochemical analysis;
- denaturing HPLC and gel electrophoresis;
- restriction fragment length polymorphism;
- hybridization analysis;

# Human Genome Project

**Prof. Dharmmedh H. Sur**

**Head-Biotechnology**

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It develops the ways of mapping the human genome at increasing fine level of precision and to store this information in databases. It also develops tools for data analysis. This project was launched in 1990 and planned with an outlay of 3 Billion US\$. It is biotechnology's first large science project. It has international collaborations between 18 countries and 250 laboratories.

The main aim of the project is to create the entire set of genome in the human cell by decoding the three billion units or base pairs (bp) of human DNA. Its full interpretations will provide the ultimate answers to the questions of human origin and how we function as healthy humans. The information will lead to a better understanding of the cause of gene-associated diseases and help doctors to design the better strategies to cure them.

Two types of maps are prepared- physical map and Genetic map.

Physical map represents the mapping of chromosomes and location of genes with accurate measurements of distance between the genes and ultimately the complete nucleotide sequence of genome.

The genetic map, on the other line, will identify the functions of genes and place them in relation to already identified genes.

Physical and genetic maps are complementary to each other. They must be integrated into one map.

To understand this let me take an example through analogy: imagine a the genome to be a long road with 1,00,000 houses on it. The physical map will tell you where each house is located on the road while genetic map will tell you who are living in the house.

## **Revelations:**

1. The human gene count is much lower than expected approximately 30,000 to 40,000 genes .
2. The nine-tenths of our genes are identical to other organisms.



3. Fruit fly *Drosophila melanogaster* and humans have only six times more genes than bacterium.
4. Humans are identical with each other at the DNA level by 99.9%. different human genes vary widely in lengths, often over thousands of base pairs.
5. Human contain about 3 million base pairs per cell. The highly complex organisms need more DNA and more proteins.

**Challenges:**

Only 97% of the genome is sequenced, the rest is considered to be unsequencable and irrelevant. A more important challenges is the annotation of the sequenced text. It involves the characterization of all the genes and their functions. All the proteins coding areas of the genome have to be identified to set a better idea of the number of genes. Presently, the estimates vary from 35,000 to 1,50,000.

**Benefits:**

The benefits of HGP are in the form of Genome map, Genetic counseling and Germline gene therapy. The incomplete data that is available is useful to the physicians to device exquisitely sensitive tests and guide the pharmaceutical companies to design drugs tailored to the genetic profile of individual patients.

The most practical way to use the new technology, in the immediate future, will be related to genetic screening and counseling. From the genome map of the patient, doctors will be able to diagnose flaws in the genes which immediately or at some near future date may flare up as genetic disease. The knowledge, in some cases, will lead to treatments that delay the onset of the diseases or reduce its effects. However, in other cases nothing could be done to counter the ravage of genetic mutations unless gene therapy becomes accessible to the common man. Still many diseases will take decades to be conquered.

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# *My Grand Salute & Tribute to Dr. APJ Abdul Kalam Sir*

## Part - X

### **HOW TEACHERS ARE NOT TEACHERS?**

**Dr. Sumit Kumar**

**Asst. Professor, Biotech. Dept., VVP Engineering College - Rajkot**

It was 27<sup>th</sup> July 2015 when I received a WhatsApp message about the sad demise of Dr. APJ Abdul Kalam. I immediately turned to TV news. What mesmerizing me was that each and every news channel was talking about the “Missile Man of India” / “The People’s President” / “The Most Humble Human Being” / “The Great Scientist” and above all “The Unforgettable Teacher” – Dr. APJ Abdul Kalam. I, being a teacher, was more interested in the news channels exploring the “teacher-side” of Dr. Kalam. If we look at the contributions of Dr. Kalam as a teacher, many of us will start thinking otherwise.



**Figure-1:** Dr. APJ Abdul Kalam Sir in the Role of a Teacher

Source: Ajay Verma, Reuters

Dr. APJ Abdul Kalam said in an interview, “Teaching is a very noble profession that shapes the character, calibre and future of an individual...youth have a dream and also they have a pain. The pain comes out of their dream; they want to live in a prosperous, happy and



peaceful India. This type of student's environment ignites me and leads me to interact with young minds". But, how many teachers recognize teaching as a noble profession? A very few or even none! In today's world, even teaching became the profession of earning bread and butter! How many teachers are really engaged in shaping character, calibre and future of an individual? A very few or even none! Therefore, in modern times, many of the teachers are not really teachers!

Dr. A.P.J. Abdul Kalam always used to say he would like to be remembered as a teacher. When he became the President in 2002, he made no compromise on his penchant for teaching. He grabbed every opportunity to teach students, especially children, wherever he went. Administering a pledge on national development to the youth was his passion. In an exclusive interview to *The Hindu* on the occasion of 'Teachers Day' on September 5, 2013, the former President said: "If the people remember me as a good teacher that will be the biggest honour for me." But, how many teachers are following the Kalam's vision of teaching? How many teachers would like to be remembered as teachers? How many teachers wish to grab opportunity for teaching students? A very few or even none!

Dr. Kalam had a multi-dimensional personality. He was well known for his passion for and contribution to science and technology in general, and space and nuclear science in particular. He was the one who made India truly nuclear. It was in 1974 that India carried out its first nuclear test. The next was in 1998 – the Pokhran-II – and through this test Dr Kalam declared to the world India's nuclear status with a bang. No one can deny Dr Kalam's scientific ingenuity. Called the 'Missile Man' of India, Dr Kalam was a great inspiration for scores and scores of young minds. He always preferred to meet and talk with children. Even as a President he was never bothered about security or protocols. He chose to spend time with school and college students – just to interact and inspire.

Known for his simple living Dr Kalam was very different from other presidents. He continued his frugal living even as a President. However, he was always willing to donate for good causes. He apparently called up Dr Verghese Kurien, the founder of Amul, and asked, "Now that I have become the President of India the government is going to look after me..., so what can I do with my savings and salary?" During his tenure as President he decided to give away all his wealth and life savings towards a fund for Providing Urban Amenities to Rural Areas (PURA), which was one of his pet projects.

He was a simple man at heart. During one of his visits to Thiruvananthapuram, Dr Kalam invited a roadside cobbler and an owner of a small eatery as presidential guests to the Raj Bhavan of Kerala. He had known these people during his stint in Kerala. Even after assuming the highest post of the country he remembered his acquaintances and invited them.

Dr. Kalam led a secular life. Though he was a Muslim by religion he read and often quoted the Bhagwad Gita. He played the Veena and loved the Tamil language. Though he played several roles like scientist, president, humanitarian, and teacher in his life, he always wanted to be a teacher and voiced it on several occasions. He also proved it through his actions as he used every opportunity to play the role of a teacher even after assuming the president's post. Maybe he was an oracle for he always used to say he would like to be remembered as a teacher. In an interview he said, "If the people remember me as a good teacher, that will be the biggest honour for me..." and even when death seized him he was lecturing students at the Indian Institute of Management, Shillong. He led by example; his whole life mirrors this.

As India mourns the passing of one of the world's great leaders and great teachers, Dr. APJ Abdul Kalam, the 11<sup>th</sup> President of India, we celebrate his life and his work. Some of the interesting facts about Dr. Kalam are as following:

- (1) As a young man in school, his teachers described him as a bright and hardworking student who had a strong desire to learn and spend hours on his studies.
- (2) Dr. Kalam studied physics at St. Joseph's College, Tiruchirappalli and later aerospace engineering at Madras Institute of Technology, the background that would lead to his famous nuclear science career as India's "Missile Man."
- (3) He was a prolific writer, writing over a dozen books on science, spirituality, and his incredible life.
- (4) Dr. Kalam's 79<sup>th</sup> birthday was recognized as World Student Day by the United Nations.
- (5) After his presidency, Dr. Kalam dedicated the rest of his life to teaching, becoming a professor at various universities in India. He was giving his a lecture at IIM Shillong in his final moments of life.



**Figure-2:** Dr. APJ Abdul Kalam Sir with students at a Children's Day Jubilee.  
Source: Ajay Verma, Reuters

Dr. Kalam was a strong supporter of the use of technology for educational purposes, and even set up a mini studio to interact with students through EDUSAT, a satellite dedicated to meet the needs of distance learners. He believed that education had the potential to transform society and teachers play a key role in shaping the future of his country. He was passionate about teaching, and it is well-known that he served as the chancellor of the Indian Institute of Space Science and Technology and a visiting professor at various prestigious institutions of higher learning. How many teachers spare time for this kind of rational thinking? How many teachers believe and work for transforming society through education? How many teachers are passionate about teaching? A very few or even none! Therefore, many of the teachers are not really teachers instead they are educational service providers! Bharat has lost the teacher of Dr. Kalam's caliber for ever. I salute this towering personality, who was a teacher at heart. May his soul rest in peace and if the belief in re-birth is true, I would like to see his return on the soil of Bharat.

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# Inspirational Quotes of Dr. AJP Abdul Kalam

Collected & Compiled by

**Dr. Sumit Kumar**

Asst. Professor, Bio-Technology Department, VVP Engineering College-Rajkot

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[1]

“A teacher should have a creative mind.”

[2]

“Failure will never overtake me if my determination to succeed is strong enough.”

[3]

“Don’t take rest after your first victory because if you fail in second, more lips are waiting to say that your first victory was just luck.”

[4]

“If you want to shine like a sun. First burn like a sun.”

[5]

“Man needs difficulties in life because they are necessary to enjoy the success.”

[6]

“Without your involvement you can't succeed. With your involvement you can't fail.”

[7]

“Excellence is a continuous process and not an accident.”

[8]

“The bird is powered by its own life and by its motivation.”

[9]

“You have to dream before your dreams can come true.”

[10]

“To succeed in your mission, you must have single-minded devotion to your goal.”

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# **Dopamine, the happy hormone, can kill tumours!**

**Prof. Pooja Chavda**

**Lecturer, Bio-Technology Department, VVP Engineering College-Rajkot**

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A 14-year study by two Kolkata-born scientists has led them to discover that dopamine - known as the happy hormone -can also kill tumours, putting them on the verge of one of the most significant medical discoveries ever.

Trials on mice have been successful, say researchers Partha Dasgupta and Sujit Basu. If human trials succeed, cancer cure will get significantly cheaper -a chemo course costs lakhs, while a vial of dopamine comes for just Rs 25.

Dasgupta is an emeritus professor with Chittaranjan National Cancer Research Institute and Basu, a professor at Wexner Medical Centre, Ohio State University. Like penicillin -said to be the biggest medical discovery in history -the cancer-killing property of dopamine was discovered almost by accident, when the duo was carrying out random tests to analyze the hormone.

Dopamine is a neurotransmitter that helps regulate movement and emotions. The duo says it also starves cancerous tumours of blood, causing them to shrink and eventually vanish. "Tumour cells multiply rapidly, making them swell very fast. We concluded that if the growth of blood vessels can be checked, tumours will stop growing and disappear. In animal-model experiments, we observed that dopamine acted very well on cancerous tumours, effectively countering vascular endothelial growth factor (that helps tumours grow)," said Dasgupta.

But dopamine fluctuation could lead to serious disorders like Parkinson's disease. "We need to know more about its efficacy in the long-run," said oncologist Gautam Mukhopadhyay.



## Astrology: Is it scientific?

*Mr. Himanshu Pithadiya*

Lab Assistant, Bio-Technology Department, VVP Engineering College-Rajkot

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In some ways, astrology may seem scientific. It uses scientific knowledge about heavenly bodies, as well as scientific sounding tools, like star charts. Some people use astrology to generate expectations about future events and people's personalities, much as scientific ideas generate expectations. And some claim that astrology is supported by evidence — the experiences of people who feel that astrology has worked for them. But even with these trappings of science, is astrology really a scientific way to answer questions?

Here we'll use the Science Checklist to evaluate one way in which astrology is commonly used. See if you think it qualifies as scientific!

- **Focuses on the natural world**

Astrology's basic premise is that heavenly bodies — the sun, moon, planets, and constellations — have influence over or are correlated with earthly events.

- **Aims to explain the natural world**

Astrology uses a set of rules about the relative positions and movements of heavenly bodies to generate predictions and explanations for events on Earth and human

personality traits. For example, some forms of astrology predict that a person born just after the spring equinox is particularly likely to become an entrepreneur.

- **Uses testable ideas**

Some expectations generated by astrology are so general that *any* outcome could be interpreted as fitting the expectations; if treated this way, astrology is not testable. However, some have used astrology to generate very specific expectations that could be verified against outcomes in the natural world. For example, according to astrology, one's zodiac sign impacts one's ability to command respect and authority. Since these traits are important in politics, we might expect that if astrology really explained people's personalities, scientists would be more likely to have zodiac signs that astrologers describe as "favorable" towards science.<sup>1</sup> If used to generate specific expectations like this one, astrological ideas are testable.

- **Relies on evidence**

In the few cases where astrology has been used to generate testable expectations and the results were examined in a careful study, the evidence did not support the validity of astrological ideas.<sup>2</sup> This experience is common in science — scientists often test ideas that turn out to be wrong. However, one of the hallmarks of science is that ideas are modified when warranted by the evidence. Astrology has not changed its ideas in response to contradictory evidence.

- **Involves the scientific community**

Sharing one's findings and critically evaluating the results of others are not integral parts of practicing astrology. An astrologer can go his or her entire career and not present findings at a scientific meeting or publish a single article. When astrologers *do* publish, these articles are not usually peer-reviewed or published in places where they will be critically scrutinized by the scientific community.



Many astrological predictions appear in newspapers — not in places where they will be scrutinized by the scientific community.

- **Leads to ongoing research**

Scientific studies involving astrology have stopped after attempting and failing to establish the validity of astrological ideas. So far, there are no documented cases of astrology contributing to a new scientific discovery.

- **Researchers behave scientifically**

Scientists don't wait for others to do the research to support or contradict the ideas they propose. Instead, they strive to test their ideas, try to come up with counterarguments and alternative hypotheses, and ultimately, give up ideas when warranted by the evidence. Astrologers, on the other hand, do not seem to rigorously examine the astrological ideas they accept. As reflected by the minimal level of research in the field, they rarely try to test their arguments in fair ways. In addition, the astrological community largely ignores evidence that contradicts its ideas.

Now it's up to you. Is astrology science?

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## Pass-out Student of VVP

**Mr. Aditya Iyer**

*2009-batch pass-out, Biotechnology Engg. Dept., VVP Engg. College*

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I joined VVP in December 2005 and as you might have guessed; Yes, I was a part of the re-shuffling process. The reason I chose Biotechnology was not because “*I did*



*not get anywhere else”* or because “*Biotechnology had a lot of scope*”. I chose Biotechnology because I WANTED to. There is scope in every field. YOU have to create it. You might say why Biotechnology in VVP? There are many colleges around India for that. At that point of time in 2005, VVP was the only college in Gujarat offering an engineering degree in Biotechnology and that’s why I chose VVP.

After getting into VVP, I met some of my closest friends and some professors whom I maintain touch till date. These include Sumit sir, Vanzara sir, Sur sir and Mr. Sachin Parikh. These are some of the people who have shaped me as I am today and I owe a lot to them. During my engineering years in VVP, I learnt one thing from faculties and my close friends. Never aim for scoring more marks. Aim for understanding the concepts. If you have to mug up something, it’s not worth the effort. I remember we would rush to Phoolchab Chowk when the results would be declared late night. The excitement of scoring high is only fleeting. The joy of understanding something conceptually is life-long. Trust me, the concepts I learnt in Vanazara’s sir class of Mass Transfer Operations is still useful to me today when I am working in Biophysical aspects of Parkinson’s disease for my PhD in Amsterdam. Ask questions openly in every lecture. Remember, there are not stupid questions...only stupid answers. I remember once we did not allow Sumit sir to teach anything in a class since we kept on asking him questions.

You might be thinking that I am a nerd and it’s easy for me to say since I was a good student. My professors will vouch for me when I say this. I was one of the

mischievous students in VVP. I got sent to the Principal twice for misbehavior. And once was reprimanded by Sur sir for writing “*By order*” on the blackboard under some announcement. Being mischievous is critical to college life, enjoy it. Being fundamentally clear is critical to a good researcher, develop it.

**Aditya Iyer**

**05BT042 ☺**

### **III International News**

#### **Aditya Iyer works on the cure of Parkinson's disease**

- Proteins do not only make you stronger, they can make you weaker when they clump together. Science has shown a strong relation between aggregated proteins and Parkinson's disease. What's starting this process? Aditya Iyer is on a mission to find out.
- Aditya is gifted. Obviously, this shows in the research that he is doing to get closer to an answer how Parkinson's disease (PD) begins. But it also shows how he communicates about it. 'Research is worthless if you are not able to explain what you do to primary school children', the PhD candidate believes. Aditya guides me around the laboratory. 'In any normal situation, muscle movement occurs when cells speak with the brain. For this neurotransmission to take place, specific molecules are needed. But people with PD do not create these molecules due to death of brain cells. This severely distorts communication with the brain.'

## **Molecules pour out and die**

The thing is: science cannot yet answer why the brain cells die, let alone find a cure. One of the attributed reasons is hole formation in cells, for which protein clumps are somehow responsible. Aditya: 'The initial clumps of protein-oligomers probably create holes in the membranes that usually protect the cells, causing its content to pour out and the cell to die. PD patients have an exceptionally large amount of protein clumps. I am determined to find out what happens in the very initial stages. Why do they clump?'



## Vinod, Vinod or Vinod?

Aditya was already fascinated by proteins since his master in India. 'I applied for a PhD position at ten American universities, to no avail.' A professor suggested to look at Dutch universities. Aditya found four projects of interest, and got pre-selected in all of them. 'After being interviewed for three projects, the fourth interview was taken by Vinod Subramaniam. It was an hilarious moment to find out that actually all four projects were led by him.'

Aditya mainly uses two machines. One of them is the spectrophotometer for quantitative experiments and the other is a super-resolution microscope for qualitative measurements. 'When proteins aggregate, they absorb differently. I can see if they begin to clump through the intensity of the light that is emitted through the protein-sample.'

As complex as it is, things are complicated more by the fact that the PhD candidate does not use proteins directly from human cells. 'We use proteins expressed in bacteria, because it is too difficult to extract them from human cells. However, these cells differ from each other, making it sometimes challenging to draw conclusions.' Nevertheless, Aditya is optimistic. 'Even if it is a drop in the ocean, knowing how and why the clumping begins can get all noses pointed in the right direction.' Aditya believes it will take ten to fifteen years before PD can be cured.

## Aadhaar

In an attempt to change the world in other ways, Aditya is part of Aadhaar. This is a charity for rural development in India, established by Indians who work at the University of Twente. 'In India, there are many areas without electricity or access to water', Aditya explains, 'One of the first projects was to establish a water pump, but the years have matured Aadhaar into an organization that invests in self-sustaining projects. 'Recently, we installed a copy machine in a school. Its revenues ensure access to newspapers and books for local children.'

Aadhaar meets once per month. Every time someone goes to India, they look for possible new projects. Aditya: 'I am leaving for India by the end of the week. I will definitely keep my eyes open for new opportunities.'

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## My View

Shrividya Iyer

2014-Pass out, Biotechnology Engg. Dept., VVP Engg. College

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It is very exciting to know that V.V.P. has won the prestigious award i.e. is the best engineering college by ISTE. The incessant support and hard work of all departments has paid off. I was very lucky to be the student of biotechnology department. With its exceptional teaching faculties and talented students the department always out performed in comparison to others.



Time and again biotechnology dept has produced some wonderful projects that have made the college to feel proud of. The passion of student's work, faculty member's guidance and dedication has always made the department and College to shine. It was a great experience studying under such reputed faculties. During these 4 years they have always been my source of inspiration and backbone of my growth. On this occasion I would like to thank all my dearest teachers and the college for giving me such a memorable experience for lifetime. Feel proud to be a VVPian.

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## Congratulations on your success:

### Results (2014-2015):

Name	SPI (CGPA)	Semester
ATTARIA JAMILA A	10.00 (9.66)	8 <sup>th</sup>
BHUMI PATEL	10.00 (9.32)	
MEHTA KINNARI B	9.41 (8.16)	
VIDUR PATEL	9.24 (8.87)	
DEVANI NIKITABEN D	8.72 (8.19)	
JOGIA MAHASWARI C	9.26	6 <sup>th</sup>
PANDEY ANJALI V	9.00	
KRISHNA KANTARIA	8.74	
CHANGANI ANANDKUMAR M	9.5	4 <sup>th</sup>
PAGHDAL ANKITA	8.12	
NAKANI AADIL	7.85	

# Result Summary

Semester	Subjects	Batch-wise results (%)			
		2011-2015	2012-2016	2013-2017	2014-2018
1	Maths-I	41.17	50	70.00	66.66
	Chemistry	87.5	78.57	80.00	71.42
	CS	94.11	100	100.00	85.71
	CPU	56.25	85.71	40.00	76.19
	MOS	43.75	42.85	30.00	---
	EG	58.82	64.28	70.00	47.61
	<b>Overall</b>	<b>63.6</b>	<b>70.23</b>	<b>30.00</b>	<b>42.85</b>
	2	Maths-II	75	78.57	80
ECE		88.23	85.71	100.00	95.00
EEE		76.47	78.57	100.00	80.00
EOME		81.25	78.57	60.00	75.00
FS/CPD		58.82	85.71	100.00	100.00
Workshop		100	100	100.00	95.00
<b>Overall</b>		<b>79.96</b>	<b>100</b>	<b>60.00</b>	<b>65.00</b>
3	Maths-III	81.25	85.71	30.00	--
	IB	75	92.85	90.00	--
	CB	75	92.85	80.00	--
	BB	93.75	92.85	80.00	--
	OCUP	100	92.85	100.00	--
	THERMO	81.25	71.42	90.00	--
	<b>Overall</b>	<b>62.5</b>	<b>71.42</b>	<b>30.00</b>	--
4	Maths-IV	93.75	83.33		--
	MGT-I	100	100	100.00	--
	MBG	87.5	100	90.00	--
	BTT	93.75	100	100.00	--
	PPE-I	93.75	100	100.00	--
	FCECS/STOI	93.75	100	80.00	--
	<b>Overall</b>	<b>75.00</b>	<b>83.33</b>	<b>80.00</b>	--
5	MGT-II	83.33	100	--	--
	AMB-I	100	100	--	--
	IMM	100	100	--	--
	CRE	100	100	--	--
	PPE-II	93.75	100	--	--
	CPE	72.20	100	--	--
	<b>Overall</b>	<b>61.11</b>	<b>100</b>	--	--

Semester	Subjects	Batch-wise results (%)			
		2011-2015	2012-2016	2013-2017	2014-2018
6	AMB-II	100	100	--	--
	FIB	100	100	--	--
	EB	100	100	--	--
	IPC	100	100	--	--
	PPE-II	89.47	100	--	--
	BPI	100	100	--	--
	<b>Overall</b>	<b>89.47</b>	<b>100</b>	--	--
7	Project-I	100	--	--	--
	EP	100	--	--	--
	AFB	100	--	--	--
	BPD	100	--	--	--
	BPE-I	100	--	--	--
	BI	100	--	--	--
	<b>Overall</b>	<b>100</b>	--	--	--
8	BPE-II	100	--	--	--
	APB	100	--	--	--
	BS	100	--	--	--
	NBT	100	--	--	--
	EM	100	--	--	--
	Project-II	100	--	--	--
	<b>Overall</b>	<b>100</b>	--	--	--

### GTU RESULT DATA ANALYSIS

SEMESTER	Batch wise results in percentage			
	2011-2015	2012-2016	2013-2017	2014-2018
1	17.64	42.85	30.00	42.85
2	31.25	35.71	60.00	65.00
3	62.5	71.42	30.00	--
4	75	83.33	80.00	--
5	61.11	100	--	--
6	89.47	100	--	--
7	100	--	--	--
8	100	--	--	--