

PROBE



The Next Generation Explorer
Volume 4 | Issue 3 | 2015



Birla Institute of Technology & Science, Pilani
Hyderabad Campus



Editor's Note



Every new issue of Probe brings you something unique. This issue is special because it is backed by the freshmen as well as the alumni evincing the strength PROBE has acquired over these years. Living up to its name; 'The Next Generation Explorer' Probe has now become a medium of conversation between the generations of alumni and the present students of BITS Pilani Hyderabad Campus.

While Ram Kumar Mishra extends his previous article on optogenetics and explains sonogenetics i.e how ultrasound can activate neurons, Himanshu Bhatt explains how hearing works in his easy-to-understand scientific article. Mary Priyanka has shared 25 facts about diabetes which will keep you surprised and so will Vishnu Kiran's story of Artemisinin. Ashiff gives an insight on 'Lab-on-chip', an application of Microfluidics for Point of Care diagnosis. Aashma talks about how eugenics will lay foundation for humankind that is truly created and treated as equal. Aashma also walks you through the recent experience of the industrial visit to Dr. Reddy's Laboratories. Sanjana P also shares the experience at LVPEI, her PS-I station. The PROBE regulars: FunPage, Department highlights, Poem corner and Photo Gallery are there to relish you as always.

Hope that the contributions keep coming always and the readers take back a feeling of satisfaction after spending some time with the 'Next Generation Explorer'.

Sumeet Chawla

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PROBE DISCUSSION FORUM

Beginning in the next PROBE issue, all PROBE issues will have a PROBE Discussion Forum where we would be publishing your views on a subject chosen in the previous issue.

WHO's Global Tuberculosis report 2015 puts Tuberculosis alongside HIV as the world's most deadly infectious disease and most new cases are from the Indian subcontinent. Where are we going wrong? In March 2015, WHO announced its 'End TB Strategy' which aims to reduce the number of TB deaths by 90% compared with 2015 by 2030. As pharmacists of today, how can we contribute?

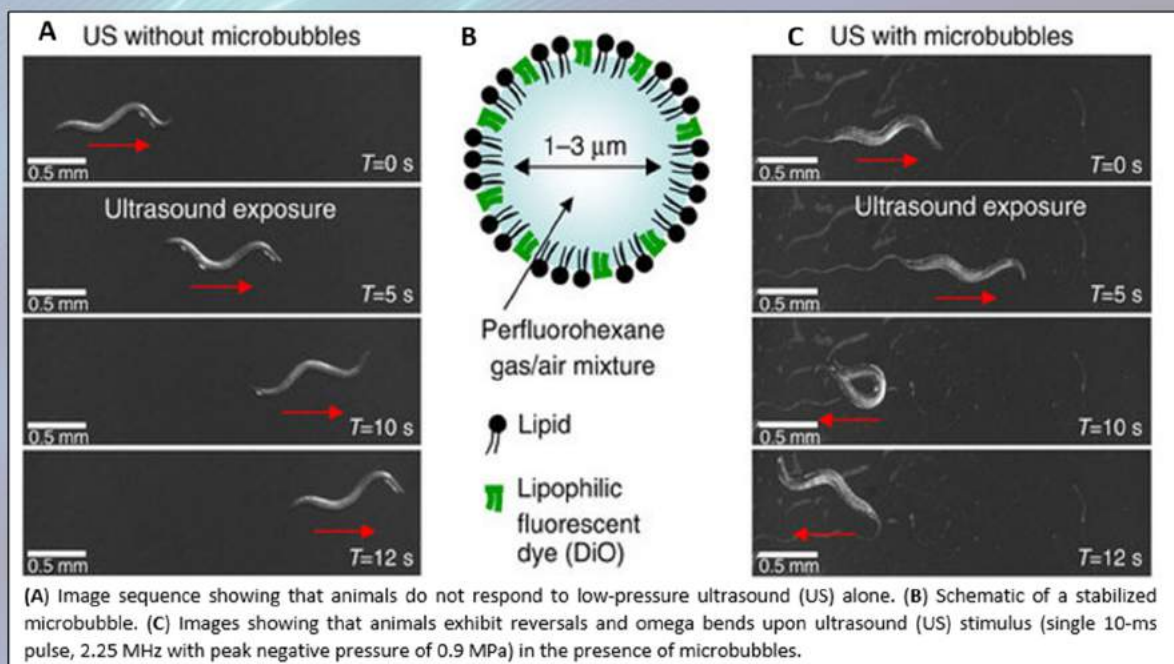
We invite you to share your views on the above topic (limited to 500 words) and suggest discussion topics for the subsequent issues before 15th December 2015 by e-mail to probemagazinebitsh@gmail.com

Sonogenetics: Can ultrasound activate neurons?

- Dr. Ram Kumar Mishra, Alumni, BPHC

In one of my previous articles about optogenetics, I described how scientists used light to control brain cells. In fact, this was considered as one of the major findings in neuroscience. It not only allowed scientists to have basic ideas about how brain works, but also opened a door to new opportunities in neuroscience. But since visible light had its own limitation of not penetrating living tissue, this technique needed a way to transmit light into the brain through a thin fiber cable. This became a major limitation as the test subjects were not completely set free for any behavioral testing (with the fiber attached).

Recently, I stumbled upon this interesting article which described that for the first time, researchers were able to change the direction of tiny nematodes after subjecting them to bursts of ultrasound waves. The ultrasound activated the neurons and then the worm turned. The new technique dubbed sonogenetics have shown similarities with its light counterpart to activate nerve cells in order to better understand the brain.



The researchers (Sreekanth Chalasani and his group) bred worms with modified nervous systems. The nerve cells were genetically modified to carry TRP-4 membrane channels which respond to ultrasonic waves. Nematodes do not usually react to ultrasound but they responded when they were surrounded by a fluid containing microscopic bubbles. These bubbles amplified the ultrasonic waves which then passed inside the worms. This technique demonstrates the use of non invasive ultrasound waves as a trigger to activate selective neurons in nematodes.

Interestingly, nematodes have primitive connections of only 302 neurons in their entire body (they don't have a proper brain). These neurons and their connections are widely known to modern day scientists. A creature so simple, that it does not have a brain, but has neurons, which have a great deal in common with neurons in complex animals with an evolved nervous system and brain. Change in movement of brainless nematodes can help to understand the role of response systems (reflex action) as well.

Both optogenetics and sonogenetics approaches hold promise in basic research by letting scientists study the effects of cell activation. They might also be useful in therapeutics through the activation of cells by disease. However, for either technique to be used in humans, researchers need to first develop safe ways to deliver light or ultrasound sensitive channels to targeted cells.

Reference:

Stuart Ibsen, Ada Tong, Carolyn Schutt, Sadik Esener & Sreekanth H. Chalasani; "Sonogenetics is a non-invasive approach to activating neurons in *Caenorhabditis elegans*" Nature Communications 2015 Sep 15;6:8264. doi: 10.1038/ncomms9264

How Hearing Works

-Himanshu Bhatt, PhD scholar

While our brains provide us with a tremendous amount of information about the sounds we hear and what they mean to us, at the most basic level our auditory system answers two major questions about any sound. First, what is the sound? The auditory system must identify what tones or frequencies we are hearing. And second, where is the sound? We must be able to locate the origin of the sound in space. Once we know what sounds we are hearing and where the sounds are coming from, our brains can begin the complex task of assigning meaning to the sounds we hear.

The process of determining what a sound is begins at a flat sheet of tissue (in the cochlea of the inner ear) called the basilar membrane. The basilar membrane detects the component frequencies, or tones, of incoming sound. The special physical properties of the basilar membrane make it particularly good at frequency detection. The membrane is flexible, and vibrates when sound hits it - but it doesn't vibrate evenly all over. One end of the basilar membrane vibrates most at low frequency tones, and the other end of the membrane vibrates most at high frequency tones. This gives the basilar membrane tonotopic organization or organization by tone, similar to a xylophone: tones are arranged from low frequency on one end to high frequency on the other. On a xylophone, if you know which bar is vibrating and where the bar is in the instrument, you can tell what note you will hear. Similarly, if you know that a group of neurons in the basilar membrane is active, and you know where those neurons reside in the membrane, then you can tell what tone you have heard.

When you play an "A" note on a xylophone, the air pulsates 440 times per second, a frequency of 440 Hertz (Hz). Those pulses trigger 440 vibrations per second along the length of the basilar membrane, with the largest vibrations occurring somewhere just past the middle of the membrane - the region of the membrane whose resonant frequency is 440 Hz. Within the resonant region, a group of neurons will begin a chorus of activity, each signaling in turn so that the group collectively signals 440 times a second.

This marvelous synchronization of vibrations in the air, in the basilar membrane, and in the activity of neurons in the resonant region is called phase-locking. Phase-locking is an important response mechanism in the auditory system; as we will see, perfect synchronization is critical to detect where a sound came from.

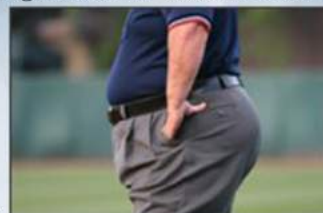
Locating sounds in space, the other fundamental task of the auditory system, is no mean feat; but our brains can determine the origin of a sound with astonishing accuracy, even when we cannot actually see the source. That ability depends on three independent methods for locating sound: a timing method, an intensity method, and a frequency filtering method. By using the results from all three methods, we are able to very accurately pinpoint the origin of sounds in space.



25 surprising facts about diabetes

-Mary Priyanka, PhD scholar

1. The name “diabetes” is attributed to the famed Greek physician Aretaeus of Cappadocia who practiced in the first century A.D. he believed that diabetes was caused by snakebite.
2. William Cullen (1710-1790), a professor of chemistry and medicine in Scotland, is responsible for adding the term “mellitus” (“sweet” or “honey-like”) to the word diabetes.
3. Insulin was coined from the Latin insula (“island”) because the hormone is secreted by the Islets of Langerhans in the pancreas.
4. Before the discovery of insulin in 1921, physicians would often put their patients on starvation or semi-starvation diets, recommending they eat only foods such as oatmeal.
5. Approximately 90% of people with Type 2 diabetes are obese.
6. Some researchers have found links between the onset of Type 1 diabetes and the contracting of a virus, especially the mumps or Coxsacki virus.
7. The death rate among African-Americans with diabetes is 27% higher than among whites with diabetes. Reasons include hereditary, socio-economic issues, higher obesity rates, and lack of available health insurance or insurance coverage.
8. Some studies have indicated that individuals with diabetes are at much greater risk for developing Alzheimer’s disease and other forms of dementia than are non-diabetics, though the reasons are unknown.
9. There are approximately 86,000 lower-limb amputations on diabetics in the United States each year. Rates of amputation were higher among men than women and higher among African-Americans than whites. Experts believe nearly half of all amputations could have been prevented with appropriate examinations and education.
10. Diabetes has been reported in horses, ferrets, and ground squirrels. In environments where animals are liberally fed, diabetes has been reported in dolphins, foxes, and even a hippopotamus.
11. Diabetes is the main cause of blindness in individuals aged 20-74 in the United States. Experts emphasize that early detection and treatment could prevent up to 90% of cases of blindness that are related to diabetes.
12. Olympic swimmer Gary Hall Jr. has Type 1 diabetes. When he was diagnosed, his physician told him to give up swimming. He changed doctors, continued training, and subsequently won a gold medal.
13. White children have a greater risk of developing Type 1 diabetes than children of other races, though the incidence of the disease varies greatly from country to country. Risk factors include being ill in early infancy, having an older mother, having a mother with Type 1 diabetes, having a mother who had preeclampsia during pregnancy, and having a high birth weight.
14. Individuals with an “apple” body shape are at greater risk for diabetes than are those with “pear” body shapes.
15. Women with diabetes are more likely to develop vaginal infections than are non-diabetics because of their elevated glucose levels.
16. A Harvard study showed that eating one serving of cooked oatmeal two to four times a week was linked to a 16% reduction in the risk of developing Type 2 diabetes. One serving five or six times a week was linked to a 39% reduction in risk.
17. Diabetes mellitus is a general name that encompasses several types of diabetes, including Type 1, Type 2, gestational, and variations such as maturity-onset diabetes in the young (MODY) and latent autoimmune diabetes of adulthood (LADA). What they all have in common is the inability to self-regulate levels of blood glucose (cellular fuel) in the body.
18. Diabetes insipidus (water diabetes) is a condition completely different from diabetes mellitus. Diabetes insipidus is characterized by a problem with the kidneys in which the kidneys are unable to concentrate urine adequately due to a deficiency in the antidiuretic hormone (ADH).
19. Clinical research found that babies who breastfeed at least three months had a lower incidence of Type 1 diabetes and may be less likely to become obese as adults.
20. In women, diabetes impacts estrogen levels, menstrual and ovulation cycles, and sexual desire.
21. Researchers found that every two hours spent watching television was associated with a 14% increase in diabetes risk.
22. Diabetes is the leading cause of kidney failure, accounting for 44% of new cases in 2005.
23. About 60-70% of people with diabetes have mild to severe forms of nervous system damage.
24. India has the world’s highest diabetes population with over 35 million people with diabetes. By 2025, this number is expected to swell to 70 million, meaning every fifth diabetic in the world would be Indian.
25. The five countries with the highest percentage of diabetes are Nauru, United Arab Emirates, Saudi Arabia, Bahrain, and Kuwait.



Obesity has led to a dramatic increase in Type 2 diabetes



Diabetes is a leading cause of blindness in American adults

Date of visit: **05.10.2015**

Place of visit: **Dr. Reddy's Laboratories, Bollaram**

Accompanying faculty member: **Prof. Sajeli Begum**

Co-ordinators (Industry): **Mr. C.S.S.J Ram Phani (Central HR)**

Participants: **M.Pharm and B.Pharm III year students**

- Aashma Shah, M. Pharm I year

Dr. Reddy's Laboratories, is a multinational pharmaceutical company based in Hyderabad, Telangana, India. The company has over 190 medications, 60 active pharmaceutical ingredients (APIs) for drug manufacture, diagnostic kits, critical care, and biotechnology products.

We, the students of M.Pharm and III year B.Pharm had a chance to visit Dr. Reddy's API manufacturing unit on 5th October, 2015 at Bollaram, Telangana organized by the Pharmacy Department, BITS Pilani Hyderabad Campus.

The experience in the industry was overall enriching and had learning memories at the API manufacturing plant. As soon as we entered the industry, we were instructed about safety requirements and were provided with the same. Initially, we were shown a presentation by Chief Chemical Engineer about company's principle, status and growth over the years. Company follows the principle of "People before Product" which was clearly visible from safety measures taken by company. We were then guided to the various blocks from production unit, QA department, Solvent recovery systems and R & D department.

They explained how every parameter plays an important role and its direct effect on quality. The consistency in quality of DRL products is the result of a rigorously implemented Quality Monitoring System to improve and optimize processes. Their efforts were primarily focused on reducing variability in process and product quality characteristics. The students were also explained about various instrumental working in QA department. Large scale manufacturing, huge reactors, bulk drug storage, packaging, everything made a visual impact and allowed us to broaden our knowledge and way of thinking as "See and learn" is always better than "Read and learn".

▼ B. Pharm and M. Pharm students with Prof. Sajeli Begum and Mr C.S.S.J. Ram Phani



PS I Diaries

PS I at LVPEI

- Sanjana P., B. Pharm III year

Rewind to 22nd May' 2015. It was when we had to report to L. V. Prasad Eye Institute. Dressed in formals and exhilarated about the day's events, we were waiting in the library until we were asked to gather for a meeting. Mrs. Snigdha, the head of the Education Department at LVPEI, was leading the meeting. She is a very calm and composed person, fun loving and at the same time dedicated towards work. She made us feel very comfortable and confident with her warm words. In the meeting, we were made aware of the rules and regulations of the institute and were explained about the various projects available for us.

Dr. A. Sajeli Begum from Dept. of Pharmacy, BITS Pilani Hyderabad, was our instructor in-charge for the programme. She was a great coordinator and an amazing mentor. She educated us with her vast knowledge and guided us in every step we took.

I along with Vikram Venkatesh chose to do a project under Dr. Archana Bhargava, General Physician at LVPEI. The project was named- "A Retrospective Analysis of Low Hemoglobin Count in Patients". As the name suggests, it was a study project on low haemoglobin count in patients and the possible reasons for anemia in them.

We discussed with Dr. Archana about how to begin and what our target should be. We then collected around 300 patient records of patients who visited LVPEI with an eye ailment, but also had haemoglobin levels less than 8g/dl. We analysed each and every record thoroughly, recorded the data we thought we might need for analysis and also understood the eye diseases that could possibly lead to anemia. Finally, we grouped the data into tables and graphs, analysed them and came up with suitable conclusions. Dr. Archana was always patient with us, took time from her busy schedule to help us whenever we needed, and always welcomed us with a warm smile. She was more of a friend to us than a mentor and we never felt neglected under her guidance.

Finally, we explained our work in the final seminar and we were very amazed to receive positive feedback. Mrs. Snigdha was overwhelmed with our patient work and the amount of effort we put in to understand the disorders, connect them to low haemoglobin levels and come up with reasons and possible treatments for anemia.

My summer at LVPEI was a very memorable one. Not only did I learn so much, but also made new friends. Practice school programme proved to be helpful in uplifting my confidence as well as provide an exposure to industry and companies. It was a great experience being a part of LVPEI for two months and if given a chance, I would love to go back there.

Central Animal Facility

The operation cum examination room



BITS Pilani Hyderabad Campus can now boast of its newly constructed Central Animal Facility which was inaugurated by Prof. V S Rao, Acting Vice-chancellor, BITS Pilani University on September 7th 2015. The animal facility located in the A block cellar is well equipped to house and maintain animal species including mice, rats and rabbits. All the animal species are housed in species-appropriate cages in appropriate numbers. With three rooms dedicated to animal housing and one operation cum examination room, animal experimentation in the department and the institute has only become easier. All the animal rooms are supplied with air-conditioning, centralized power supply with round the clock backup and lighting of 12/12 light-dark cycle. Two parallel corridors connecting the four rooms prevent the mix up of any infected animal or material. The facility has a separate room for storing husk, feed, empty cages and lids. A part of the facility is assigned for washing and cleaning to maintain proper hygiene standards. Animal weighing balance, refrigerator, animal restrainers, animal cage carts, filter tops are available in the facility while autoclave, inhalation anaesthesia system and deep freezer are expected to be installed soon. Following of in-house guidelines is a must while using the facility.

Freshmen Orientation



The freshmen orientation for 2015 B. Pharm and M. Pharm batches was held on 11th August 2015, just a few days after the students landed on campus. The event kicked off with students introducing themselves, talking about what they wanted to do in BITS, their goals and dreams in the field of Pharmacy. The faculty introduced themselves to the students, cleared their doubts and encouraged them to learn about the campus and its many programs, flexibilities and resources. The students were eager to learn about the many opportunities and activities offered at BITS. Seniors showered a lot of *gyaan* onto the students, major topics involving zero attendance, CGPA, placements and work-life balance.

The students after freshmen orientation

In the department

Congratulations!

New Jobs

Ms Priyanka Purkayastha - Post doctoral researcher, GVK Informatics, Hyderabad
Ms Shalini Saxena - Research Associate, Laxai Avanti Life Science, Hyderabad
Mr Manoj C - Group Leader, Kemio Solutions Pvt Ltd, Bangalore

Scholarships

BMS Scholarship - Mr Kunal Ninave, M. Pharm I year
TATA Scholarship - Ms Aashma Shah, M. Pharm I year

PhD degree awarded

Scholar

Mr Ram Kumar Mishra
Ms P Brindha Devi
Mr Mahibalan S
Ms Reshma Chowdary Alokam
Mr S Ganesh
Mr Manoj C
Ms Khan Rukaiyya

Supervisor

Prof. P Yogeeswari
Prof. D Sriram
Prof. A sajeli Begum
Prof. P Yogeeswari
Prof. D Sriram
Prof. D Sriram
Prof. A Sajeli Begum

Thesis Submissions

Scholar

Ms Priyanka Purkayastha

Supervisor

Prof. P Yogeeswari

The story of Artemisinin

- Vishnu Kiran, PhD Scholar

Now that Artemisinin is in news for one half of the Noble Prize in Physiology or Medicine, 2015 awarded to Prof. Youyou Tu, a Chinese pharmaceutical scientist. Here is a brief story of evolution of Artemisinin (qinghao-su in Chinese).

Malaria has affected human survival for as long as we know, treatment to which is limited by the resistance developed by the *Plasmodium* strains against the available treatment options. In the 1960s, the main treatments for malaria were chloroquine and quinine, but they were proving increasingly ineffective. This created an urgent need for new antimalarial medicines. In 1967, a national project 523 (named after its official starting date, 23rd of May 1967) was created by China in this regard. Youyou Tu and her team, as a part of it, embarked upon an effort to develop new malaria therapies. For this she turned to traditional Chinese medicine and searched for recipes that had been used for thousands of years to treat fever. During the first stage of their work, they investigated more than 2,000 Chinese herb preparations and identified 640 hits that had possible antimalarial activities. More than 380 extracts obtained from about 200 Chinese herbs were evaluated against a mouse model of malaria. However, progress was not smooth, and no significant results emerged easily.

Tu's group discovered that the plant *Artemisia annua*, sweet wormwood showed a promising degree of inhibition against parasite growth. However, the activity was inconsistent, showing varied results of 12-40% inhibition in subsequent experiments. So again Tu turned to ancient literature and studied recipes by Ge Hong 340 AD. There she found a description describing an approach to obtain "juice" from the leaves of *A. annua* using cold water instead of the traditional boiling method. This inspired her to use an alternative cold extraction procedure with ether, rather than a previously used ethanol extraction. Using this low-temperature extraction process, Tu achieved consistent results, killing 100% of the malaria parasites in infected mice and monkeys.

In order to help patients with malaria, Tu along with her colleagues had bravely step up to be the first person to take the extract. After establishing that the extract was safe for human consumption, they carried out anti-malarial trials with patients infected with both *Plasmodium vivax* and *P. falciparum*. This was a genuine break-through in the discovery of Artemisinin and a turning-point in finding a novel drug to combat malaria. Artemisinin, which is a sesquiterpene lactone, along with its derivatives were developed and stabilized. They are also being investigated in treatment of cancer and other therapeutic uses.

Now, the overall global death toll from Malaria during the last 15 years has declined by 50% (WHO, 2015). Thanks to Mother Nature!



Youyou Tu

Born: 1930, Zhejiang Ningpo, China

Affiliation at the time of the award:
China Academy of Traditional Chinese Medicine, Beijing, China

Prize motivation: "for her discoveries concerning a novel therapy against Malaria"

1



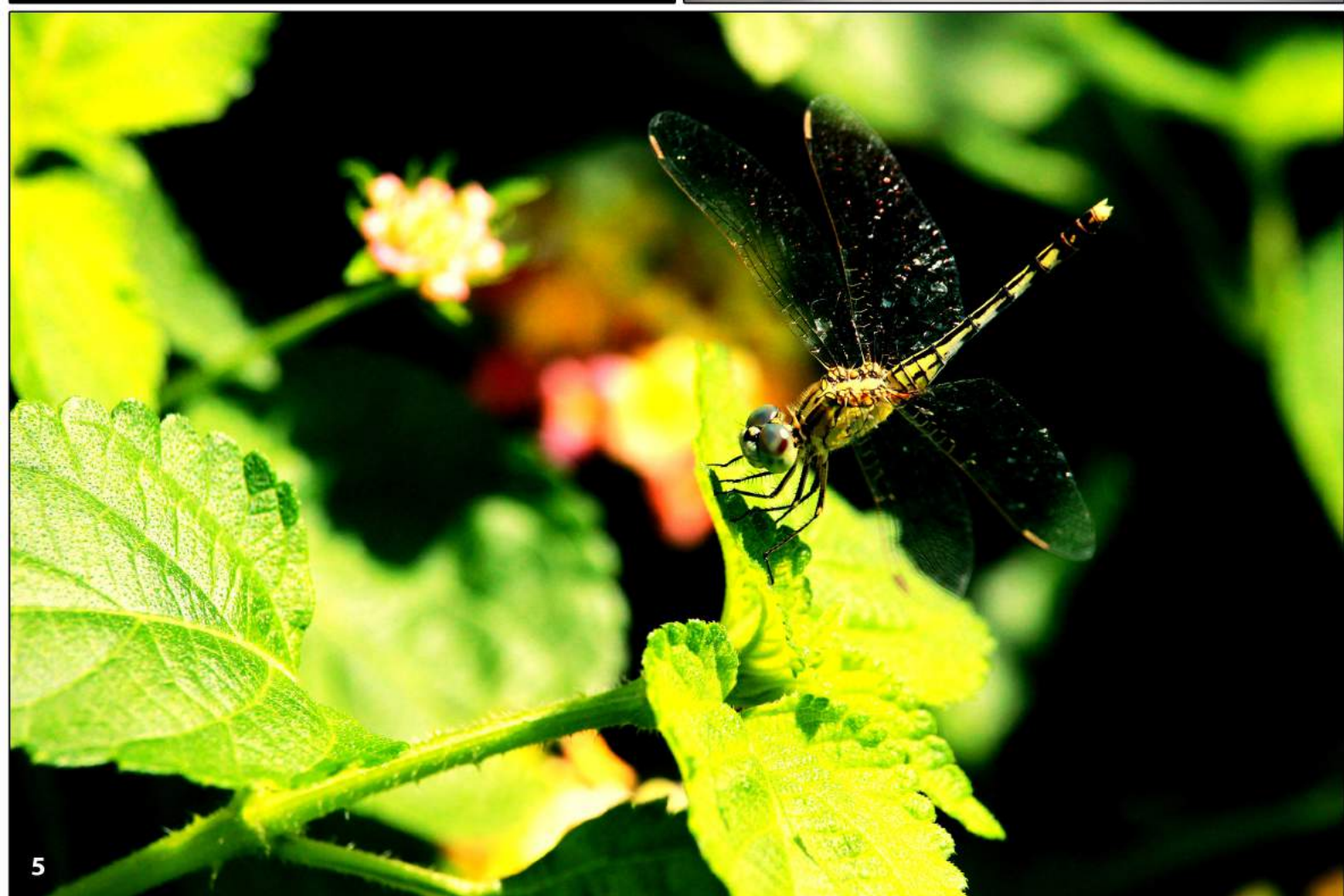
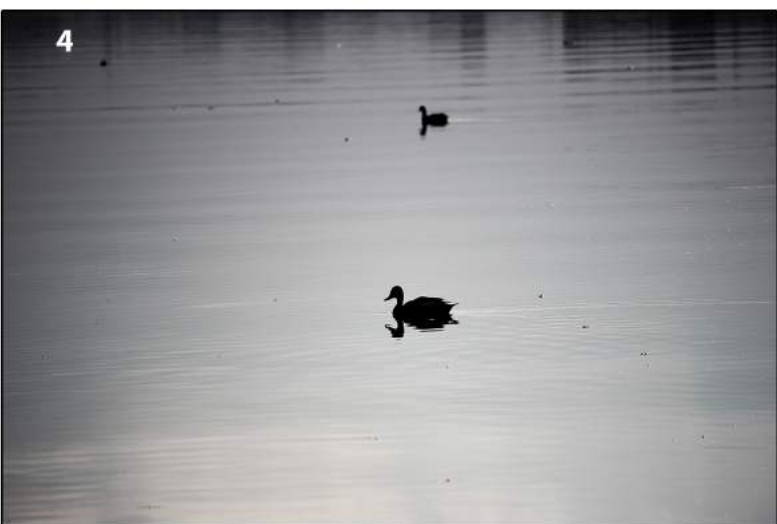
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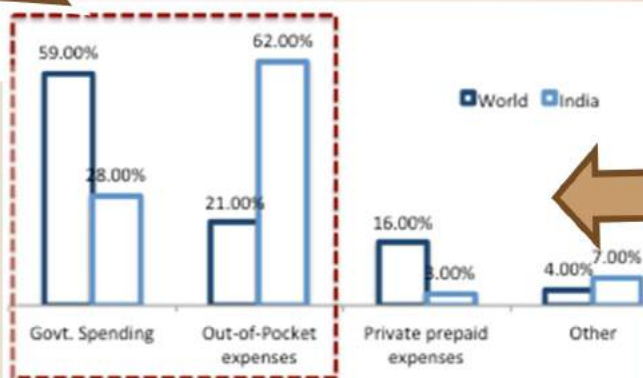


5

by Ashiff Shaik

Lab-on-Chip [LoC] :

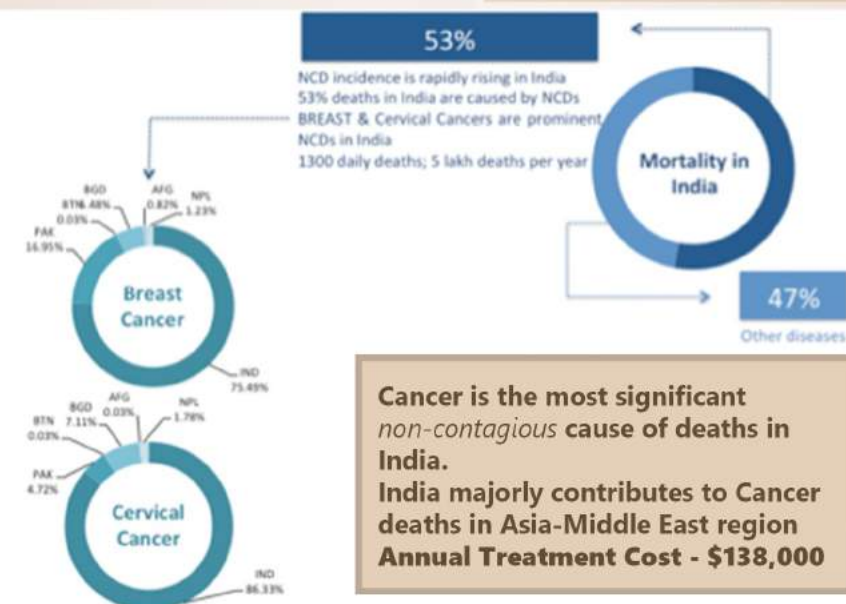
Efficient, affordable, and easily deployable device that integrates lab functions on a miniaturized chip; using extremely tiny fluid volumes. It is an application of Microfluidics for Point of Care diagnosis [PoC].



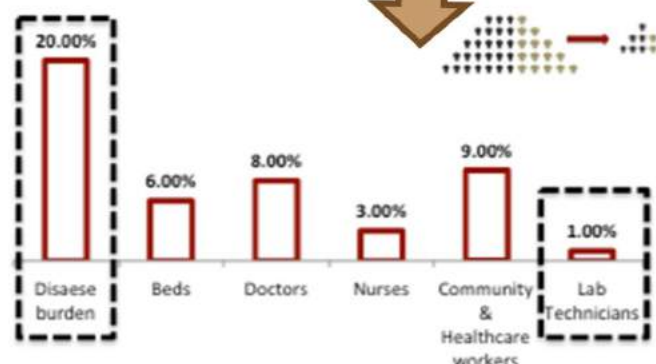
Poor Government schemes & support lead to high healthcare expenditure

KEY HEALTHCARE DATA POINTS - INDIA

- 3rd most HIV infected in the World
- 20% share of Global Disease Burden
- Rapid rise in Non Communicable Diseases [NCD] - Cancer, Cardiovascular etc.
- 64% Indians lack access to treatment & healthcare
- Poor healthcare infrastructure compared to WHO standards
- Most diseases aggravate due to late diagnosis & treatment
- Tremendous need for affordable, simple, accurate & rapid diagnosis



Cancer is the most significant *non-contagious* cause of deaths in India.
India majorly contributes to Cancer deaths in Asia-Middle East region
Annual Treatment Cost - \$138,000

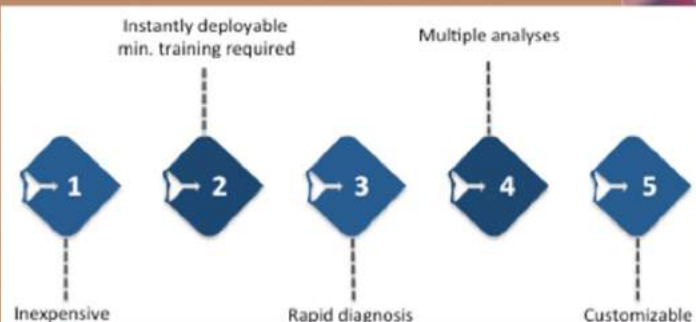
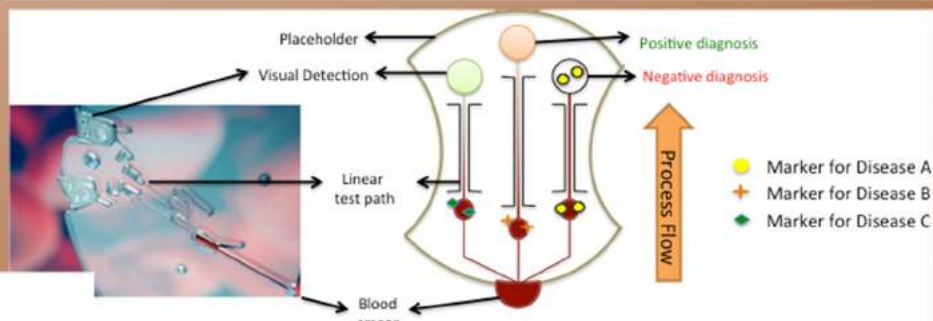


Applications of Lab-on-Chip

- Early detection of communicable and non-communicable diseases; with specific biological markers
- Small and easily deployable device, that requires minimal training; useful for skill deficit nations
- Low cost of diagnostic device to diagnostic labs makes diagnosis affordable to patients; thereby increases healthcare access
- Multiple diseases can be detected from one drop of blood simultaneously in multiple channels; increases throughput

Working Principle

Blood, which is pricked and placed on the smear plate, progresses along micro channels and reaches the reagent plate. After mixing with test reagent, the mixture migrates to the detection plate along micro channels by capillary suction force. Reaction occurs between disease substance & test reagent to produce visual detection at the detection plate. Presence of disease is indicated as Positive or Negative.



Research@BPHC: Yogee'S Bioinnovations Pvt. Ltd., founded by Prof. Sriram and Prof. Yogeeswari, incubated at TBI, BPHC is currently focused on disease diagnosis, especially in cancer.

Author of this piece is an alumni of BITS Pilani Hyderabad (Pharmacy). He is interested in marrying problems in healthcare sector, with modern healthcare access tools and human intelligence.

Eugenics: Its unlimited possibilities and unbeatable ethicality

- Aashma Shah, M. Pharm I year

"Cultural evolution cannot completely replace genetic evolution. The ethical values, the social beliefs and the religious customs will enviably be moulded depending on the effects they have on the human gene pool."

This, in brief, is the gist of Mr. Wilson's book on "Human Nature". When the eminent biologist from Harvard, honoured with the Pulitzer prize wrote-so, he was clearly making a sweeping statement on the boundless power of the human genome.

And eugenics is a promising reflection of that very power defined by Galton, as the Science which aims to improve the genetic endowment of the human population, eugenics, in conjunction with other upcoming technologies and sciences-genetic engineering is paving the way for a better tomorrow with genetically better equipped people. The excision of sickle cell anaemia causing gene from embryonic cells, in May 1999, in the USA, led to birth of healthy twins who were neither victims nor carriers of the disease, thereby permanently removing threat of sickle cell anaemia from the family's genetic lineage. Similar victories have been documented against cystic fibrosis, tay-sachs disease and certain sex-linked disorders. Quite obviously, the beneficiaries and their near and dear ones will unflatteringly support and applaud these techniques of eugenics irrespective of magnitude of hue and cry created by some self-appointed ethicality watch dogs, over this 'tampering with the genetic blueprint, that has been bestowed upon by the creator'

Moving on to the intellectual front, research has proved that genes play an important role there too. The commonest form of senile dementia – Alzheimer's disease- is known to be caused by at least four different genes and there is a strong evidence that the disease runs in families. Another case in point is the XYY syndrome – the presence of an extra Y chromosome in an overwhelming number of hardcore criminals. One does not need to do a masters in economics to realize that continuing to shelter such genetically defective individuals well into the future too, would be an enormous drain on the already scarce global resources. It is imperative to curtail the propagation of the strain into the next generation.

This definitely does not mean the withdrawal of counselling and rehabilitary services for the current victims. But yes, people suffering from serious hereditary diseases must be convinced to go in for sterilization or otherwise debarred from producing children, till corrective genetic surgery becomes accessible to all. The joys of parenthood can always be found with the adoption of orphaned children in need of loving homes.

Such a measure would not be an encroachment of human rights; rather, it would be an execution of the human duty to leave the world a better place. The encouragement given to the carriers of desirable genotypes for assuming responsibilities of bearing children, must not make the genetically challenged feel inferior – there is every chance of the technique of eugenics may actually make them genetically perfect in the future. In fact, the world is already witnessing the benefits of the infant science of eugenics. Genetic screening and genetic counselling are helpful multitudes of individuals and couples to make informed personal choices. Research in the field of eugenics must be allowed to continue, of course, with the guaranteed promise that human beings shall never be used mindlessly as guinea pigs. We must remember that it is the application, never the science itself, which is ethical or unethical. We must redeem this wonderful science of eugenics from the notoriety it has become clouded with, on account of its misuse by that Nazi's in Germany – on account of their mass genocide of all these who they considered to be genetically inferior.

We must realize that only eugenics can revamp the human genome by doing away with the uncalled for genetic garbage of harmful and unhealthy mutations. By ensuring that nobody suffers from the inadequacies of their genotype, eugenics will bring each member of the human race to the optimum conditions, thus laying the foundation for humankind that is truly created and treated as equal.

Department in ATMOS 2015

ATMOS, the annual technical fest of BITS Pilani Hyderabad Campus saw tremendous participation from the Department of Pharmacy. Four events were conducted by the department.



ANATOMY OF A MURDER

BIOLOGY | CHEMISTRY | PHARMACY
PRIYANKA - 9542556477
KRITI SHARMA - 8185051379
SANJANA - 8185920612
WWW.BITS-ATMOS.ORG

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Hyderabad Campus



Pre-ATMOS

For the first time, we conducted a pre-atmos event which was a huge success. The event- "How to save a life" was a fun event which witnessed great participation from various disciplines on campus. Participants were pharmacists for the day. They were given situations where their patients were in trouble and they were needed to save their lives. The participants came up with innovative solutions for the various problems within the given time span. Ultimately, the ones who could save the most number of patients were declared the winners of the event.



Anatomy of a murder

"Anatomy of a murder" was the biggest and one of the headliner events for ATMOS. This was conducted in association with the Biological sciences and the Chemistry department and saw a participation of more than 350 students.

There were two rounds and teams of maximum 3 people could participate. First round was a simple forensics quiz and 12 teams were selected for the second round. In the second round, teams were shown a crime scene and given clues accordingly. After deducing and performing certain tests, the teams were to find the killer. The teams were also given certain important documents like the post mortem reports, drug test reports etc. The event was a grand success.

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BIOLOGY & PHARMACY

NATURE O' TRIVIA

Everybody has a corner of their brain which serves as a repository for all the interesting facts and trivia about nature. Trigger your grey cells and fire your neurons for this Life-Science quiz!

ANATOMY OF MURDER

Amazed by the crime scenes in CSI? Want to unravel those mysteries and unveil the murderer? For all those Sherlocks out there, Anatomy of Murder is a dream come true. Come feel the adrenaline rush this ATMOS.

PAPER PRESENTATION

Bring out the scientist in you! Here at ATMOS'15, we present you a platform to showcase your stellar research.

CONTACT:
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Sanjana Pabbati: +918185920612



Paper presentations and Nature O' Trivia

Paper Presentations were conducted together by the Department of Pharmacy and Department of Biological Sciences. Nature O' Trivia was a quiz and was a successful event which saw participation from various col-

Coca-Cola

ORIGINALLY A COUGH SYRUP!

- Sanjana P., B. Pharm III year



You must be wondering what Coca Cola has got to do with curing anything or how this all-time favourite beverage is being compared to bitter or tasteless drugs!

But yes, Coca Cola was once sold in the market as a medication for cough. Coca Cola was invented by a pharmacist named John Pemberton in the year 1886. Pemberton was also known as "Doc". He fought in the Civil War, at the end of which was severely wounded. Pemberton then became addicted to morphine like many other wounded veterans and he wanted a cure for his addiction.

At that time, laudanum was the only decent anaesthetic. It is an opium derivative and was soon replaced by morphine. Morphine is another opiate which came out after 1820. Morphine became immensely popular for it could cure ailments, pain, cholera and diarrhoea which were simply everyday living conditions. It was also used as relief for cold.

Around the year 1858, an Italian neurologist Paolo Mantegazza visited South America and he witnessed the use of coca by the natives. He then tested it and published a scientific paper.

Around 1863, Angelo Mariani, a French Corsican chemist, had read Mantegazza's paper and became intrigued with coca and its financial potential. He concocted a beverage called Vin Tonique Mariani, which was made from Bordeaux wine and coca leaves. It was to be used as a substitute for the opiates.

This beverage originally contained 6 mg of cocaine per fluid ounce of wine, but the wine that was exported contained 7.2 mg per ounce, in order to compete with the higher cocaine content of similar drinks in the United States. It became extremely popular in Europe, with famous users such as Queen Victoria, Thomas Edison, Pope Leo XIII, and Pope Pius X. Pope Leo even awarded a Vatican gold medal to the wine, and publicly endorsed it!

But with the growing concern of drug addiction and alcoholism, in 1885 Atlanta enacted Temperance Legislation to curb the use of alcohol. Pemberton then began experimenting to produce a non-alcoholic alternative and came up with a syrup. This syrup was made of cane sugar and extracts of coca leaves and cola nuts (caffeine). This syrup was then diluted with water and cooled with ice cubes. This was the first form of Coca Cola!

This formulation contained 8.46 mg of cocaine and its effects were enhanced by the caffeine. It was originally advertised as a cure for morphine and opium addictions. Then on May 8, 1886, the soft drink was first sold to the public at the soda fountain in Jacob's Pharmacy in Atlanta. On May 29, Pemberton ran the first advertisement for the beverage in the Atlanta Journal.

After Pemberton's death, a man named Asa Griggs Candler rescued the business. In 1891, he became the sole owner of Coca-Cola. And In 1898, Congress passed a tax in the wake of the Spanish-American war. The tax was on all medicines, so Coca-Cola wanted to be sold only as a beverage. After a court battle, Coca-Cola was no longer sold as a drug.

Today it is a very popular beverage, sold in every corner of the world.

बैठ गए किताबों के पन्नों
उन बारिशों के पानी में
छत हैं नहीं सर छुपाने को
पढ़ने खेलने की उम्र में
चल पड़े घर चलाने को॥

शिक्षा नहीं मजदूरी में
प्रेम नहीं फटकारों में
लिए दर्द आँखों में
युही बीत रहा समय
चार पैसे कमाने में॥

खुद कमाते हैं बच्चे
रोजी रोटी के लिए
माँ-बाप के नहीं भरोसे
इसलिए समय से पहले
इतनी जल्दी बड़े हो जाते बच्चे॥



POEM Corner

अमरदीप सिंह

F U N Corner

~Best way of answering questions in Viva~

(you should be really fast in answering)

Q) Name 4 local anaesthetics.

A)Procaine, Lignocaine, Sugarcane, cocaine

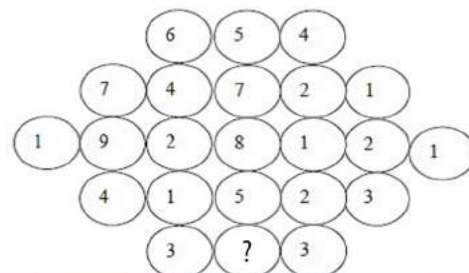
Q)Good! Name 4 beta blockers.

A)Metaprolol, awaharlal, timolol, mohanlal, atenolol

Q)very good! Now tell me 4 ACE Inhibitors.

A)Captopril, enalapril, march-april, I isinopril

Find the missing value



"I told you million times your research on Lontophoresis is useless.
We have power cut all the time! ... Are you listening?"

Do you know?

- ☑ As you age, your eye color gets lighter
- ☑ The human eye blinks an average of 4,200,000 times a year
- ☑ The longest living cells in the body are brain cells which can live an entire lifetime
- ☑ There are more living organisms on the skin of a single human being than there are human beings on the surface of the earth
- ☑ We forget 80 percent of what we learn everyday
- ☑ Astronauts cannot burp in space. There is no gravity to separate liquid from gas in their stomachs
- ☑ Wearing headphones for an hour increases the bacteria in your ear 700 times

Music Therapy

-Shubham Dwivedi PhD Scholar

Music therapy is an established health service similar to occupational therapy and physical therapy and consists of using music therapeutically to address physical, psychological, cognitive, terminal illness such as cancer, and/or social functioning for patients of all ages. Music therapy interventions can be designed to promote wellness, manage stress, alleviate pain, enhance memory, improve communication, and provide unique opportunities for interaction, ultimately leading to feeling comfortable and relaxed. Music therapy does not need you to know music. Music therapy sessions may include listening to music, singing, making music with simple instruments, writing or discussing song lyrics, or using guided imagery alongside music.

Research in music therapy suggests triumph of musical interventions in several areas such as facilitating movement and overall physical rehabilitation, enhancing motivation towards treatment, emotional support for clients and their families, and creating an outlet for expression of feelings. Since music therapy is a powerful, non-invasive and non-threatening medium, unexpected positive results are possible.

Music therapy in Mental/Neurological disorders

Music therapy is an effective as well as valid treatment strategy for individuals having psychosocial, affective, cognitive and communicative needs.

Autism is a congenital neurodevelopmental behavioural disorder occurring in early childhood and is characterized by impaired socialization, communication abnormalities, limited activity and curiosity and stereotyped patterns of behavior. Research advocates strong connections between speech and singing, rhythm and motor behavior, memory for song and memory for academic material, and overall ability of preferred music to enhance mood, attention, and behavior to optimize the student's ability to learn and interact. Thus, music therapy in autistic children provides an initial assist using melodic and rhythmic strategies and also aids in generalization and transfer to familiar/unfamiliar environments with musical cues. All over music therapy serves as an integral component in helping the child with special needs attain educational goal as well as social interaction.

Parkinson's disease and Alzheimer's disease are incurable diseases where music therapy appears to be beneficial as a part of patient's treatment, mobility, as well as psychological and emotional changes, affects the quality of life of elderly people as a result to seek for effective treatment. Music therapy improves the quality of life of patients as well as their emotional state. Music is used as a tool for calming the tremor and assists the ease of movement of the patients. Slow, rhythmic movement can slow down overactive body rhythms and induce relaxation and sleep. Apart from movement, music also helps in patient's articulation if their speech becomes slurred and unclear. Memories and important meaningful moments of their lives emerge with the use of music in the therapy setting. Moreover, music therapy can be a supportive tool in treatment as it has been mentioned in researches. Combining exercise with enjoyable and creative music experiences can often maintain overall health and well-being. Reports also suggest beneficial effect of music therapy in other neurological conditions such as chronic depression, trauma and substance abuse. It has been reported to reduced muscle tension, improved self-image/increased self-esteem, decreased anxiety/agitation, increased verbalization, enhanced interpersonal relationships, improved group cohesiveness, enhanced self-expression and self-awareness. Increased motivation, improved perception and differentiation of feelings, improved ability to titrate abreaction, self sooth, recognize and cope with traumatic triggers.

Music therapy in Cancer

Music therapy may help patients with cancer to cope up with certain ill effects associated with cancers such as pain, anxiety, depression, sickness etc. Music therapy can be a safe place for people to explore fear, anxiety, anger and the range of emotional responses to living with cancer and ultimately makes them feel good. Listening to a favourite piece of music may calm and relax the patient. According to Turkish study (2013) music therapy and guided visual imagery reduces anxiety, nausea and vomiting in patients under chemotherapy. In 2011, researchers reviewed all the studies that used music therapy to help cancer patients psychologically and physically. There were 30 trials and 1,891 people participated. The results suggest that music therapy can lower levels of anxiety in people with cancer but the same was not evident for depression. The music therapy could also slightly lower pain levels, heart rate, breathing rate and blood pressure.

Generally, music therapy is very safe and has no side effects. But very loud music or particular types of music may make some people feel uncomfortable or irritated. The music may trigger strong reactions or evoke memories which might range from pleasant to painful. Thus selecting right kind of music may help in attaining unexpected positive goals in terms of treatment in various diseases.



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