“It would be possible to describe everything scientifically, but it would make no sense; it would be without meaning, as if you described a Beethoven symphony as a variation of wave pressure.”
— Albert Einstein

“An expert is a person who has made all the mistakes that can be made in a very narrow field.”
— Niels Bohr

“The saddest aspect of life right now is that science gathers knowledge faster than society gathers wisdom.”
— Isaac Asimov

“If we knew what it was that we were doing, it would not be called research, would it?”
— Albert Einstein
Love is in the air!
Yes, its Valentine's Day and we are here with a 'Love'ly issue of PROBE. Having its origins in the Roman holiday Lupercalia, the first Valentine's Day dates back to the 5th century. A day of Romance as its is known for, Team PROBE brings to you its first-ever themed issue. We have in store for you a bright and colorful magazine with articles ranging from Exploring the Neuroscience of Love to A tale of Love from the Department. In this issue, we also introduce the new members of the BITS Pharmacy family, the newly joined Research Scholars and we have also introduced a new column named “PROBE Proverb” which will be the food for your thought. Some interesting and factual articles on Zombies, Unboiling Eggs and the newly discovered “Vibrational Bond” also awaits your attention. With all the scientific articles on one side, we have an experience story from our very own Ram Kumar Mishra, speaking about the lessons he learnt during his Ph.D. The regular columns on Departmental activities and the Fun Page is now added with a Photo Gallery, showing the talent of some budding photographers in the department. So let’s go ahead, an adorable issue of PROBE awaits your thoughtful eye.

- Sumeet Chawla
Editor, PROBE.
**Autoimmune diseases** are the third largest category of illness in the world today, after cardiovascular diseases and cancers. Among them type 1 diabetes, affect 100 million people worldwide. It is caused by autoimmunity-mediated destruction of pancreatic β cells, leading to insulin deficiency, hyperglycemia and several other complications. Currently there is no effective cure for type 1 diabetes. Injectable insulin is one of the major medical strategy for cure. However, it accompanies serious medical complications and side effects. Despite recent advances in antidiabetic strategies, no strategy is clinically successful. In the present paper, we review some plant derived drugs like Gymnema sylvestre (which is said to benefit diabetic patients by increasing the production of β cells and thus producing more of insulin involved in maintaining the glucose levels) and Conophylline (which has been found to help in increasing β cell mass by inducing β cell differentiation and thus preventing hyperglycaemia by maintaining blood insulin level required to prevent and treat type 1 diabetes). We will be emphasising on the chemistry and biology of these molecules in terms of regulation of β cells and immune cells. Additionally, recent developments like role of BCG vaccine in type 1 diabetes treatment will be discussed.

*Conophylline*

Conophylline, a dimer of aspidosperma-type indole alkaloid is a Vinca alkaloid extracted from leaves of a tropical plant *Ervatamia microphylla*.

To study its effect on the β-cell regeneration AR42J cell line has been used. AR42J cells express markers of both exocrine and neuroendocrine cells and resemble in many aspects the progenitor cells observed in regenerating pancreas. Activin A which is produced in the gonads, pituitary gland, placenta, and other organs regulates differentiation of AR42J cells. The differentiation completes in two steps starting with conversion of progenitor like cells to Pancreatic polypeptide (a hormone) expressing cells followed by conversion to insulin producing cells. Activin A induces expression of ATP sensitive potassium and a pancreatic hormone (PP) which expresses various neuron markers. But Activin A causes cell apoptosis in AR42J cells, so Activin A was accompanied by Betacellulin (BTC) belonging to the epidermal growth factor (EGF). When AR42J cells were incubated with a combination of Activin A and BTC, activin mediated apoptosis was prevented. Differentiated AR42J cells contain insulin secretory granules similar to that of β-cells. They were also able to secrete insulin and express glucose transporter-2(GLUT2) and glucokinase.

Type 1 diabetes (T1D) is the result of selective destruction of the insulin-producing β-cells in the pancreatic Islets of Langerhans. The estimate of the actual number of diabetics in India is around 40 million. The present treatments for T1D include insulin replacement therapy, pancreas transplantation and islet transplantation. Unlike pharmaceutical drugs that warn of a host of uncomfortable and potentially deadly side-effects, treatment with natural products poses no threat of ill side effects. In the recent years secondary plant tissue metabolites have shown great potential for new drug development and research in medicine.
BCG

No Immunotherapies have been found to reverse diabetes in humans. However, in rodents, Bacillus Calmette Guerin (BCG) reverses disease by restoring insulin secretion. In humans also it has been found that there has been a sporadic preservation of β-cell function when BCG vaccine is administered soon after the onset of diabetes and also it has been suggested the BCG vaccine in the childhood is found to reduce the incidents of T1D. Hence there is substantial interest if BCG vaccine could be used as primary, secondary or tertiary vaccine for the treatment of type 1 diabetes.

Conophylline causes β-cell differentiation thus significantly increasing insulin content in the pancreas. Similarly Gymnema sylvestre leaf and callus extract showed anti hyperglycemic effect in alloxan induced wistar rats. Also BCG injected and EBV virus effected subjects which are both triggers of TNF factor showed higher levels of Tregs in the blood. Thus these plants and vaccine have a great potential to replace the present cumbersome therapies and reduce the financial burden associated with the management of the disease and overcome the limited and palliative effects of the existing therapies. Natural products such as Gymnema sylvestre and conophylline, and BCG vaccine show potential in the treatment of type 1 diabetes.

Table 2

<table>
<thead>
<tr>
<th>Treatment group</th>
<th>B-Cell regeneration frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10th day</td>
</tr>
<tr>
<td>Group I (normal)</td>
<td>81.0 ± 2.82a</td>
</tr>
<tr>
<td>Group II (diabetic control)</td>
<td>16.0 ± 2.16</td>
</tr>
<tr>
<td>Group III (insulin)</td>
<td>38.0 ± 2.62b</td>
</tr>
<tr>
<td>Group IV (leaf)</td>
<td>49.0 ± 4.54e</td>
</tr>
<tr>
<td>Group V (callus extract 1)</td>
<td>53.3 ± 8.07c</td>
</tr>
<tr>
<td>Group VI (callus extract 2)</td>
<td>42.3 ± 5.89ef</td>
</tr>
<tr>
<td>Group VII (callus extract 3)</td>
<td>51.3 ± 3.13cd</td>
</tr>
<tr>
<td>Group VIII (callus extract 4)</td>
<td>30.3 ± 2.12g</td>
</tr>
<tr>
<td>Group IX (callus extract 5)</td>
<td>28.0 ± 6.01gh</td>
</tr>
<tr>
<td>Group X (callus extract 6)</td>
<td>27.3 ± 3.77i</td>
</tr>
</tbody>
</table>

Values are mean of 3 replicates per treatment and repeated thrice. Values with the same letters are not significantly different at 5% probability level according to DMRT.

* GCE1 = blue light with 2.4-D (1.5 mg/l) + KN (0.5 mg/l); GCE2 = blue light with 2.4-D (1.5 mg/l) + KN (0.5 mg/l) + MES (5 mg/l); GCE3 = blue light with 2.4-D (1.5 mg/l) + KN (0.5 mg/l) + MES (5 mg/l) + MS (0.5 mg/l); GCE4 = blue light with 2.4-D (1.5 mg/l) + KN (0.5 mg/l) + MES (5 mg/l) + MS (0.5 mg/l) + NA (1.0 mg/l); GCE5 = blue light with 2.4-D (1.5 mg/l) + KN (0.5 mg/l) + MES (5 mg/l) + MS (0.5 mg/l) + NA (1.0 mg/l) + RN (1.5 mg/l).

These are excerpts from the prize winning review paper by Manik Bajaj and Salvi Porwal from BITS Pilani, Pilani Campus under the guidance of Dr. Atish T. Paul (Assistant Prof., Department of Pharmacy, BITS Pilani) in the Paper presentation competition organised in APOGEE 2014, the Annual Technical Festival of BITS Pilani.
Genetically Modified Human: Milestone in life Science

- Shubham Dwivedi, Ph.D. Scholar

The next frontier of genetic modification is not centered on a certain fruit or vegetable, but humans. Micro humans or genetically modified (GM) human will be designed with interacting organs that can be used in drug tests, accelerating the process of FDA and other government regulatory approvals without disparaging animals currently used in laboratories. The developers of micro humans are hoping to release this technology in market by 2017. ‘The Times of India’ reported that according to researchers this could replace up to 90 million animals each year in labs. One of the micro human developing firm said “If our system is approved by the regulators, then it will close down most of the animal-testing laboratories worldwide.” Each GM human will be tiny creature with approximate size of a microchip itself, and is supposed to mimic the response to substances inhaled, absorbed in the blood, or exposed to in the intestinal tract as in human. The smartphone-sized microchips of GM human will be programmed to replicate up to 10 major human organs. Although many artificial organs (organ-on-chip) viz. artificial kidney, heart, lung or gut are already being used to observe the use of drugs on certain organs in various cosmetic industries and few labs, however results must be verified on live being to make sure that substances are safely interacting with living beings.

The numerous governmental agencies of United States, Europe and Asia are funding Organ-on-chip (OoC) microphysiological systems (MPS) programs under which development of individual organs-on-a-chip and coupling human-cell, multi-organ, organ-on-chip and larger human organ construct (HoC) systems for drug development and efficacy as well as toxicity studies. Allometric Scaling is one of the approach to get the correct relative organ size for milli or micro human considering weight of human, millihuman and microhuman as 60kg, 60g and 60mg respectively. There is a difference in organ size based on the body mass (M_total) but organ size does not scale proportionally (isometrically) with M_total. It obeys a number of different allometric power laws instead, that describe as the animal’s linear dimension (L) increases, its mass increases as L^3, and hence the cross-sectional area of the bones must increase non-linearly. Metabolic rates may exhibit M_b^{3/4} scaling, pulmonary and vascular networks exhibit M_b^{3/4} scaling and blood circulation time scales as M_b^{1/4}. Table 1 shows the coefficients A and B, derived from primates with body masses of 10 g to 100 kg, to compute organ mass M = AM_bB.

When multiple organs are connected, their relative size could be normalized to mass, surface area, volumetric flow, or other geometric measures. The challenge is to specify the appropriate scaling law(s) for specific applications, it may be to create a physically functional organ (e.g., a pumping heart), a pharmacodynamic model (3D co-culture systems), or both simultaneously in a MPS. Allometric scaling offers an admirable starting point for specification and validation of coupled OoC/HoC systems. However, this scaling may not produce valid parameters for mHu and μHu systems, which can be easily observed from Table 1 that the large human brain size (a = 88) and its allometric scaling exponent (b = 0.66) would produce a μBrain that has twice the body mass of the μHuman. Thus, allometric scaling for the brain, pituitary, and adrenals will produce larger than average organs, while that for the thyroid will be smaller. Interconnected “histological sections” is an ideal approach for OoC/HoCs operated in isolation, since it effectively avoids the need for scaling by simply observing a small portion of an organ. This is a rational approach which allows to preserve specific organ functions at their appropriate relative magnitudes, rather than relying on the classical, allometric approach. Provided that the functions selected should be quantifiable, it manages a straightforward approach to designing both the device and the functional readouts of a complete OoC system.

Mad Scientists Wing (DAPRA)

The biotechnology companies working with the United States military are supposed to create GM humans as next venture, with ultimate goal of producing a ‘super soldier’
to perform Olympic-style physical feats without need of food or sleep. The 'super soldiers', will even be able to regrow limbs that were destroyed by enemy fire and live off of their fat stores for extreme lengths of time. The Pentagon’s Defence Advanced Research Projects Agency (DARPA) has earned the nickname of the 'mad scientist' wing for its flourishing experiments in fusing biology and technology more over modifying life.

**Shortcomings of Micro Human in Drug Testing Laboratories:**

1. Like animals, micro humans also may not respond in the same way as a human body because of the size as well as some other factors which may require further experiment on primates.

2. Organs cannot be divided into 'fake' computerized components. Interaction of organs with one another, the endocrine system, the brain, the nervous system, environmental cues and emotions are not easy to mimic in microhumans.

3. The misuse of this type of technology to build artificial humans for war (Super Soldiers) could cause a global catastrophe.

The GM human farm appears great on paper, as the approach to eliminate animal testing is indeed noble, they do not address probability of far-reaching, negative consequences for trying to re-create the complexities of Mother Nature’s form. The question if data from micro humans can be directly extrapolated to humans or still animals/prime study is still unanswered. Overall, this approach could reduce investments in various aspects (time, animals, dose requirement etc.) and be a milestone in the field of life science.

**References:**


Exploring the Neuroscience of Love

- Shreya Jain, B. Pharm (3rd Year)

“How on earth are you ever going to explain in terms of chemistry and physics so important a biological phenomenon as first love?”

—Albert Einstein

The human brain is a remarkable thing. A collection of a hundred billion neurons is responsible for all levels of perception, ranging from the basic senses such as vision and touch to more complex emotions and experiences such as love and fear. All these put together form the basis of human consciousness.

Love is an emotion that has been talked about, written about, sung about, from millennia ago and just like everything else, it must have a biological basis. It has been explored by various fields of science such as evolutionary psychology, evolutionary biology, anthropology and neuroscience. Everyone knows of the association of the hormone oxytocin with the general feelings of love, health and wellbeing. But what about the neurocircuitry involved with these feelings?

Various functional magnetic resonance imaging studies have been conducted to try and understand the neurological basis of love. In one such study conducted by Ortigue et al., the participants were instructed to perform a lexical decision task (LDT) each time they saw a visual stimulus flash on a computer screen. The LDT is a procedure used in many psychology experiments which involves measuring how quickly people classify stimuli as words or nonwords. Each trial was composed of a sequence of three frames but what was different about this study was that for each participant, three unique words were used as prime stimuli.

“Love prime” – The first name of the participant’s beloved.

“Passion prime” – A noun describing the participant’s passion in life (eg., dance, piano, etc.)

“Friend prime” or “control prime” – The name of a friend.

The results of the fMRI study showed that the use of a love prime stimulated the caudate nucleus, ventral tegmental area, insula, bilateral fusiform regions, parahippocampal gyri, angular gyrus, left dorsolateral middle frontal gyrus, left inferior temporal gyrus, occipital cortex, and cerebellum. On the other hand, a passion prime showed greater activation in the caudate nucleus, insula, bilateral fusiform regions, parahippocampal gyri, right angular gyrus, occipital cortex, lingual gyrus, and cerebellum, as compared to the control. We see a lot of overlap here but primarily, the love prime evoked more activation in bilateral angular gyri and bilateral fusiform regions when compared to the passion prime and this strongly indicates the involvement of these specific regions in the feeling of love.

Many such studies have been and currently are being conducted in order to get a clearer picture of what goes on in the brain when people fall in love. We have all heard statements like “love is addictive”, “love is obsessive”, “eye contact is a lover’s magic”. And all these do have a scientific basis.

For interested readers, “A General Theory of Love” is a book written by three professors of psychiatry from University of California, San Francisco – Thomas Lewis, Fari Amini and Richard Lannon. It examines the phenomenon of love and human connection from a combined scientific and cultural perspective and would definitely make for a good read.

I would like to end this article with a beautiful quote by Dr. V.S. Ramachandran, one of the greatest neuroscientists in the world today, about the awe inspiring ability of a bunch of neurons to give rise to perception and consciousness.

“How can a three-pound mass of jelly that you can hold in your palm imagine angels, contemplate the meaning of infinity, and even question its own place in the cosmos? Especially awe inspiring is the fact that any single brain, including yours, is made up of atoms that were forged in the hearts of countless, far-flung stars billions of years ago. These particles drifted for eons and light-years until gravity and chance brought them together here, now. These atoms now form a conglomerate- your brain- that can not only ponder the very stars that gave it birth but can also think about its own ability to think and wonder about its own ability to wonder. With the arrival of humans, it has been said, the universe has suddenly become conscious of itself. This, truly, it the greatest mystery of all.”

References:
https://www.goodreads.com/quotes/tag/neuroscience
A middle aged, antisocial, brutally honest and sarcastic doctor is probably the most admired character in the field of ‘science TV’. Yes, House MD has become my favorite TV show and Gregory House (played by Hugh Laurie) my favorite TV show character. Dr. Gregory House with his team of young diagnosticians runs a “Differential Diagnosis” Department at the Princeton Plainsboro Teaching hospital in New Jersey. He tackles health mysteries as would a medical Sherlock Holmes, all the while playing mind games with his colleagues, students and his best friend, the oncologist Dr Wilson.

It is not only the character of Dr House that makes me a big fan of the show, it is the relevance of their medical cases in real life. Although many of the cases they discuss are rare events and reaching the correct diagnosis after giving multiple treatments for previous misdiagnoses hold a very less possibility in real life, the medical and surgical techniques, the drug names, names and classification of diseases is something every pharmacy or medical student can relate to. The TV show regularly had cases where an autoimmune disease, rare genetic condition, drug abuse or an underlying fungal infection was at play. After watching all the episodes of the TV show, I can now tell which organ is failing by what color the pee is, what are the rare genetic conditions diagnosticians miss on and every time I watch an episode I find myself yelling “It’s not Lupus,” “It’s MS!” or “Do a Lumbar puncture!”. There have been moments, ‘moments of Nirvana’ when I was able to tell what House’s treatment/diagnostic strategy would be. It may seem at first that show is only about diagnosis, but it’s not. It is about how House reaches that diagnosis using unorthodox methods without the thought that his medical license is at stake. The brilliance of the show is the insights it reveals of how we think and react why we do things a certain way – and why we are our own worst enemies. Few shows have said more about humanity.

House is a rockstar. There is no beating him when it comes to witty comebacks. He is abrasive yet correct; genius yet immature; rational yet egotistical; reckless yet charismatic. He is by far the most complicated fictional character that has laid the foundation for eight brilliant seasons. Start watching! You just can’t help but fall in love with him!

If you talk to God you’re religious. If God talks to you, you’re psychotic.

Gregory, House M.D.
When our reserved and studious college girl met this naughty, outspoken boy during the first year of college, they soon realized they were meant to raise kids and commit to each other for their whole life! From that day in 1997 when Sir confessed his love for her, they realized they had the proud privilege to interview this young couple for our Special V-Day PROBE issue and they did it on the spot.

What are the elements that you admire in each other?

Swati: He has always been very supportive. He is amazing with the kids. My kids sometimes do not miss me when I’m working but they always want him around. He does not practice or encourage a male dominated way of living; he fulfills his duties equally in all aspects.

Balaram: Honesty - she never lies to anyone, like NO ONE. Sometimes we are in situations where we need to lie to some people around us, but she NEVER lies to anyone. She has always been crazy about science and that is something that has helped us find stability in life. She never gets convinced with a NO. She will find her way through things; she is inarguably tenacious. She is kind and never hesitates to say sorry. There have even been situations where she made me say sorry to others when I was not willing to, justifying by saying that I might have made mistakes in my previous life and that is what I was being sorry for.

What have been the hardest and easiest elements of staying married?

Swati: The hardest thing has been his anger. He gets angry often and that is just something I have to deal with. The easiest thing with Balaram is that you only have to say things once and he does it. There is absolutely no nagging and complaining about anything.

Balaram: The hardest thing for me has been maintaining a good professional life and balancing that with a family and kids. The easiest part of marriage has been sharing my thoughts and ideas. I have a friend for a wife and wife for a friend. We grew up in the same conditions, we have the same friend circle and we studied the same things. Everything is just so easy to share with her.
of B.Pharm in 1994, who knew they would become friends, explore science together, fall in love, is love for ma'am with an “ami tomake bhalobashi”, they have not looked back. They acknowledged the idea almost instantly.

How do you balance the needs of being a mom (dad), wife (husband) and a teacher?

Swati: Balaram takes care of the kids most of the times. We are always working. We never take a break. Either one of us is always working. I also make sure I spend quality time with my kids every day.

Balaram: Both of us work very hard. From 4.50 AM when the alarm goes off to 10:00 PM when we go to bed, we are always working. When I am with my kids, I do not switch ON my laptop. We try to maintain the same routine to keep the balance in life.

What is your advice to young researchers and students on love?

Swati: Respect. Respect the girl and her situations and constraints. Trust. Trust the other person’s capabilities, money is not something that lasts forever. Stand up for yourself, there is nothing more rewarding than that. Inculcate tenacity of mind and character. Someone will have to compromise professionally to a certain level at some point of time, talk about it before going forward.

Balaram: Think long term! Romance can be enjoyed for days, months and even years. But think of the end of it. Find stability in life! Once you have a stable boyfriend or girlfriend, try to build up and maintain your career at this age. Try to balance your professional and personal lives. Allot time for studies, research, your career, romance, family and friends. Do not get carried away with any of these.

We congratulate Swati Ma'am and Balaram Sir for discovering the most sought after secret – the secret of love and a happy marriage. We wish them many more years imbued in the science of love and the love for science!!
Passion and purpose—in short, doing what you love—could be difficult to find. Having said that, when I first started writing my research plan, there was no funding in place to pay me during my initial days at BITS-Hyderabad.

Reflecting back on the journey I have been through in the last 4 years, as I surge forward into post PhD life, I can honestly say I’m a completely different person from the fresh faced, naïve 25-something I was back then.

As an experienced PhD researcher, I am one among few who are setting the example for the next-generation researchers from the department. In my personal experience and wisdom, I would pass on three following lessons that I have learnt throughout my PhD:

1) Enjoyed It!

When you first start a PhD you think 3 years is a long time and that you have all the time in the world to get all the research you want to do and more. That is not the case and 3 years fly by! But as long as you have enjoyed the journey and the experiences along the way then that’s all that really matters. Perhaps this is easy for me to say as I have nearly finished my PhD, but I have grown in many different ways since starting my PhD. Firstly, I am now a confident researcher, I was a lead member of this magazine for two long years, where today I’m advising the new PhD cohort on aspects of the PhD they may not have been aware of. I am more confident in my networking and presenting skills, something I used to be terrible at but I know it is such a valuable asset within the research arena. I have exceeded my own expectations of what I can achieve and I am very proud of the work I have carried out and the skills I have developed and acquired as part of this journey. Apart from research, now I am a more confident photographer, I can code in R and I know how to write something the right way. This is probably the most important lesson I have learned and I’m sure other PhD researchers of past and present feel the same. If you haven’t enjoyed it, then may be research isn’t for you.

2) Be Realistic

There are many opportunities during a PhD where you ask yourself “What is my ultimate goal?” You may be lucky like I was. Have almost complete creative control of the research you are conducting, but it is very important to consider the likelihood of successfully achieving that goal. For instance, if you know you have little or no funding for the research, don’t decide to include a technique which requires expensive kits and consumables for you to carry out the research. Find out what equipment is available to you and design your research around that. That’s not to say you can’t incorporate your original ideal method into your research, but make the most of what is available to you and take the opportunity to step out of your comfort zone and try something new. You are much more likely to achieve your goal when the means to do so are within your reach and not a funding bid away.

3) Stay Optimistic

How much ever difficult it may seem at times to remain positive when your funding bid hasn’t been accepted, your results are the opposite of what you were expecting or you’ve received bad feedback from a journal article submission that basically says “Why are you even bothering with this, it’s rubbish!” it is vital you remain positive. It’s ok to have rant and cry about it, but don’t let it hold you back or beat you down. Each of these barriers are actually learning curves as they encourage you to look at your work critically to see why they said no, why it’s not working like you’d hoped, or why they think your paper isn’t good enough. Upon reflection you may understand where you went wrong and in the future you’ll know what to do. Ultimately, you will appreciate the barrier being put in your way because you will hurdle over it as you develop your research and skills. If you remain positive, rather than dwelling on the problem you’ll find it much easier to progress and evolve your research. As with anything, there will always be downs, but that just make the ups much more enjoyable.
Zombies have become extremely popular in the last few years. In fact, if there is a fictional apocalypse, there is a pretty good chance that it involves zombies. Zombies have a long fictional history, with stories about the undead monsters appearing in as far back as the early 19th century. They came to limelight in the 1960s with several movies that follow the struggle of a few survivors against hordes of zombies intent on consuming their brains. Now, they are present in all mediums of story-telling from books and stage plays to movies and video games.

Ludicrous as it sounds, the concept of zombies is not limited to science fiction alone. The Cordyceps fungus (Ophiocordyceps unilateralis) is a parasitic fungus that infects carpenter ants and essentially takes over their brains. It also damages most of the tissues in the ant’s body and makes it climb to the edge of leaves or tree tops, where they remain by tightly holding with their mandibles (i.e. they bite down on the edge). The ant dies soon and the fungus sprouts from the head for a few weeks before exploding and scattering the spores over big areas, so that more ants can get infected and continue the life cycle.

Cordyceps is not restricted to ants alone. There are multiple species of the fungus, with each of them specializing on a particular host. As the nature commentator David Attenborough puts it, “the more numerous a species becomes, the more likely it is to be preyed on by this fungus”, restoring balance to the ecosystem.

A parasite altering the behaviours of hosts is, of course, not unknown. Rabies virus famously induces hydrophobia (fear of water), since drinking water would decrease the chances of the virus (which is present mainly in the salivary glands) spreading to other hosts. There are multiple examples of different parasites which can even induce a zombie-like behaviour similar to Cordyceps. Dicrocoelium dendriticum is yet another parasite which causes ants to hold tight to leaf tips so that they’ll get eaten by grazing animals in whose digestive systems their life-cycle enters the next phase.

The Cordyceps explanation for zombies is used in the popular video game “The Last of Us” and the book “The Girl with All the Gifts”. They get around the limitation that it does not affect human beings by making them mutated strains. In The Last of Us, the mutation is caused by a virus attacking the fungus (like bacteriophages which can affect bacteria and alter them). This is an all too real possibility, as evidenced by the various diseases that have hopped from one species to another such as the avian flu.

Ref: https://www.youtube.com/watch?v=XuKJBiBBAL8
http://io9.com/12-reall-parasites-that-control-the-lives-of-their-hosts-461313366

The pictures are of Dead ants infected with Ophiocordyceps unilateralis (Pictures Source : http://www.vocesabia.net)
...and ‘The Research Scholar of the Year’ award goes to....

The Pharmacy Group had the announcement for the ‘Research Scholar of the Year’ award sponsored by Bharat Biotech on the 2nd of February 2015 and the award was presented to Ms. Renuka J. for her all-round performance. Team Probe got a chance to interact with her and here is the piece from the interview:

Congratulations on being selected as the "Research Scholar of the Year"? How did you feel when you found out that you had won? Was it a complete surprise? Thank you. I was undoubtedly delighted. Considering that a variety of aspects were being considered for selection this year unlike the last year, competition had to be tough. Initially I was ambivalent to apply for the award, but Dr Sriram encouraged me to. I was very happy to have been shortlisted for the list top six contestants but winning the award was a total surprise.

What do you think it is that makes you stand apart from your fellow researchers?
Each research scholar here is unique and everyone is talented in their own way. The selection was based on many aspects of one’s research. All I can say is that hard work and sincerity can take you anywhere.

How will winning this award affect your future work?
Appreciation of this kind makes one more self-confident. I will try to excel at whatever field I work in and do full justification to it.

What do you think about the selection criteria for the award? Do you want to suggest any changes to it?
Compared to the previous years, the selection criteria this year was better in the way that it covered many aspects. However, I feel that it would be better if the selection criteria is revealed to everyone before the applications for the award are invited, this would cause lesser doubts among participants and increase transparency.

What is your advice to the recently joined research scholars and other young researchers?
I don’t think I am in a position to advise but I would like to say that research should be done to learn the concepts and principles behind science and positive results may not always be achieved. One shouldn’t be disheartened but learn to keep their expectations low. It is always suggested to start something from scratch so that one understands the underlying concepts better and will make you more confident. Also, try to be proactive and take the lead. This is a competitive world!

Ms Renuka J. is currently pursuing her PhD under the guidance of Dr. D Sriram at BITS Pilani Hyderabad Campus. She is working on Design and biological evaluation of DNA GyraseB as drug target of Staphylococcus aureus and MRSA strain to treat clinical and pathological infections. She holds M. Sc. in Biotechnology from Osmania University, Hyderabad, India. She has more than 15 peer reviewed papers in international journals to her credit.

The Name is BOND, VIBRATIONAL BOND!

- A. Rishi, B. Pharm (3rd Year)

One of the fundamental laws of chemical kinetics is that the rate of the reaction increases with increase in temperature, but, as new experiments suggest this might not be the case in all situations. A group of Canadian scientists have discovered that in the reaction between a bromine molecule and muonium (an isotope of hydrogen) the rate of the reaction slowed down as they increased the temperature of the reaction medium. This was found to be because of formation of a new kind of temporary bond which lowered the total energy of the structure. The existence of this bond was theorized in 1989 but it was only confirmed last December when they used quantum chemical calculations facilitated by huge advances in technology in the past few years allowing scientists to track very fast reactions. This bond is similar to 3 centered 2 electron bond of Diborane (B,H) in the sense that one atom is being shared by two other atoms. The bond between the muonium atom and the bromine atoms is such that the muonium atom bounces between the two bromine atoms like a Ping-Pong ball between two bowling balls in a state of constant vibration. This bond however is short-lived as the reaction itself is very fast paced. This bond was not discovered by a decrease in the potential energy (which normally indicates the forming of a new bond) of the system but in the vibrational energy of the system. But the crux of the issue is whether it will have any implications on the pharmaceutical world, only time will tell.

A viral storm is rampant across the country. Even the ministers are not spared. Rajasthan home minister Gulab Chand Kataria was tested positive for swine flu, a day after it was confirmed that former chief minister Ashok Gehlot was down with the disease. In Andhra Pradesh, Araku MP Kothapalli Geetha tested positive for swine flu. Such is the fright of swine flu that people are taking all possible ways to save themselves from being infected by it. More than 200 deaths due to Influenza A (H1N1), known as swine flu, have been recorded within a short period of over a month. As the weather cools and autumn sets in, the days grow shorter, the temperature drops, footballs fly - the flu strikes. Getting the flu is never amusing. It can rather be dangerous. Mostly young children, the elderly and those who are already sick are prone to the flu. It can be fatal for those who are already weakened by illness or age which makes matter worse. Fortunately, there are number of things which prevent the flu from entering your house.

What is Swine Flu?
• Swine flu is a respiratory disease caused by influenza viruses that infects the respiratory tract of pigs and result in a barking cough, decreased appetite, nasal secretions, and listless behaviour.
• Swine flu viruses have the ability to mutate (change) so that they are easily transmissible among humans.

The History
• Swine-origin influenza A (H1N1) virus in humans have been identified in swine in the United States since 1998. On April 15 and April 17, 2009, the Centers for Disease Control and Prevention (CDC) identified two cases of human infection with a swine-origin influenza A (H1N1) virus.
• The 2009 swine flu pandemic was first observed in Mexico and was responsible for 14,286 deaths worldwide. Try to keep your life as stress-free as possible and make sure that you get eight hours of sleep each night.

Influenza A(H1N1)

- Cough
- Headache & Body Ache
- Fatigue
- Chills
- Nausea
- Sore Throat
- Diarrhea
- Vomiting
- Fever

Symptoms
Symptoms of swine flu in humans are similar to most influenza infections: fever (100 °F or greater), cough, nasal secretions, fatigue, and headache. These may be associated with joint pain and diarrhoea.

Prophylaxis and Treatment?
• Vaccination is the best way to prevent or reduce the chances of becoming infected with influenza viruses. Two antiviral agents, zanamivir (Relenza) and oseltamivir (Tamiflu), have been reported to help prevent or reduce the effects of swine flu if taken within 48 hours of the onset of symptoms.
• The most serious complication of the flu is pneumonia. Such patients may require additional supportive measures such as ventilation support and pneumonia treatment.
• One of the easiest approaches to protect yourself from the flu is to live a healthy lifestyle. If you are tired or malnourished, your immune system may not be com o  Although the H1N1 virus also circulates in pigs, you cannot get it by eating properly handled and cooked pork or pork products.

o Relying on natural or homeopathic methods to prevent the disease is unwise and dangerous, according to the American Academy of Pediatrics. The risk of getting the virus is without a doubt higher than any minor risk associated with getting vaccinated.

o Do not wait for fever. Half of the swine flu cases do not present with fever. Get yourself tested if you are presented with the other symptoms.
Dr Rajeev Raguvanshi, Vice President, Differen-
tiated Formulations R & D at Dr Reddy’s Labo-
ratories Ltd visited the campus on Feb 2nd 2015
and delivered a talk titled - “Innovation in
Indian Pharma: What Ails us and Responsibility
of Educational Institutes”. He also presented
the “Research Scholar of the Year” award to the
winner.

The 66th Indian Pharmaceutical Congress
was held between 23rd-25th January, 2015
at HITEX, Hyderabad. The theme for the
event organised by Indian Pharmaceutical
Congress Association and hosted by All
India Drugs Control Officers’ Confedera-
tion was ‘India-Pharmacy of the World -
Role of Indian Regulators and Pharma In-
dustry’. Research Scholars and faculty from
the department attended and presented
posters during the event.

The 2014 American Association of Pharma-
ceutical Scientists (AAPS) Annual Meeting and
Exposition was held between November 2-6,
2014 at the San Diego Convention Center, San
Diego, USA. Mr. Praveen Kumar Mandapalli
and Mr. Suman Labala presented posters in
the event. Mr. Mandapalli received DST, ICMR
and CICS travel award for his presentation
while Mr. Labala received ICMR and CICS
travel award for the presentation.
Prasanthi Malapati
Area of work: Designing and synthesis of novel drugs to targets of tuberculosis.
She has completed her M.S. (Pharm) from NIPER- Hyd specialized in Medicinal chemistry and she has worked for Novartis, India for an year.
Supervisor: Professor D. Sriram

Shubham Dwivedi
Area of work: Neuroscience; Approach towards understanding diseases and novel targets in treatments.
He completed his B. Pharm from NRI Institute of Pharmaceutical Sciences affiliated to Rajiv Gandhi Technical University and M.S. (Pharm) from NIPER Guwahati. He has a specialization in Pharmacology and Toxicology.
Supervisor: Professor P. Yogeeswari

Mary Priyanka Udumula
Area of work: Pharmacological evaluation of novel pkr (protein kinase R) inhibitors in diabetic and vascular complications
She graduated B. Pharm from Chaitanya Institute of Pharmaceutical Sciences, affiliated to Kakatiya University, Warangal and M. Pharm from Department of Pharmacology, Kakatiya University.
Supervisor: Dr. Arti Dhar

Nikhila Meda
Area of work: Drug discovery and biological evaluation.
She completed her Bachelors’ degree in Biotechnology from Nizam college, Hyderabad and has a Masters in Biochemistry from Bhavan’s college, Hyderabad. She has worked at CRIDA, an ICAR Institute for 4 years.
Supervisor: Professor D. Sriram

Now you can UNBOIL an Egg.

It has often been said that you can’t unscramble an egg. But you might be able to unboil one. When you boil an egg, the heat causes the proteins inside the egg white to tangle and clump together, solidifying it. New research published in ChemBioChem by scientists at UC Irvine shows how they can essentially reverse the clumping process by adding chemicals to a cooked egg.
"Yes, we have invented a way to unboil a hen egg," UCI biochemist Gregory Weiss said in a statement. "In our paper, we describe a device for pulling apart tangled proteins and allowing them to refold."
And they didn’t just go for a standard 10-minute hard boiled egg. No, the researchers decided, just to make absolutely sure the whites were cooked, to boil the eggs for 20 minutes at 194 degrees Fahrenheit. Adding urea to the eggs untangled the knotted proteins by chemically breaking them into bits, returning the eggs to a liquid form. (Note: Urea is one of the main ingredients in pee, so these unboiled eggs are probably not delicious.) Then the researcher put the (now liquid) solution into a machine called a ‘vortex fluid device.’ The device pieces the broken proteins back together within minutes—a vast improvement over older methods of reconstituting proteins, which could take days.
But unboiling eggs isn’t the main focus for the researchers. “The real problem is there are lots of cases of gummy proteins that you spend way too much time scraping off your test tubes, and you want some means of recovering that material,” Weiss said.

Other researchers from around the world have been looking into the unboiling issue, including researchers from Malta who published research on the same subject last January. The scientists at UC Irvine have filed for a patent of their method, and hope that it will eventually find uses in industries from cheese-making to pharmaceuticals.
Source: http://www.popsci.com/scientists-figure-out-how-unboil-eggs
**STORY WITH A MORAL**  
Source: Quora

**SCENE:** It's a fine sunny day in the forest, and a rabbit is sitting outside his burrow, tippy-tapping on his typewriter.

Along comes a fox, out for a walk.

FOX: "What are you working on?"

RABBIT: "My thesis."

FOX: "Hmm, what is it about?"

RABBIT: "Oh, I'm writing about how rabbits eat foxes."

(INCREDULOUS PAUSE)

FOX: "That's ridiculous! Any fool knows that rabbits don't eat foxes!

RABBIT: "Sure they do, and I can prove it. Come with me!"

They both disappear into the rabbit's burrow. After a few minutes, the rabbit returns alone, to his typewriter and resumes typing.

Soon a wolf comes along and stops to watch the hard working rabbit.

WOLF: "What's that you're writing?"

RABBIT: "I'm doing a thesis on how rabbits eat wolves."

(Loud Guffaws)

WOLF: "You don't expect to get such rubbish published, do you?"

RABBIT: "No problem. Do you want to see why?"

The rabbit and the wolf go into the burrow, and again the rabbit returns by himself, after a few minutes, and goes back to typing.

**SCENE:** Inside the rabbit's burrow.

In one corner, there is a pile of fox bones. In another corner, a pile of wolf bones. On the other side of the room a huge lion is belching and picking his teeth.

**THE END**

**MORAL:**
- It Doesn't Matter What You Choose For A Thesis Subject.
- It Doesn't Matter What You Use For Data.

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**LAB 1**

**LAB 2**

Cartoon by: Madhu Babu Batti, PhD Scholar

Congratulations, great work!! I'm impressed with your dedication

Thank you very much sir
“Photography is a way to shape human perception.”

Contributed by Sarath Chandra (#3,#5,#6)
B. Pharm (1st Year)

and Sumeet Chawla (#1,#2,#4)
B. Pharm (3rd Year)

PICTURE GALLERY