ATAVISM

A STUDENT-RUN SYNAPSE NEWSLETTER

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ABOUT US

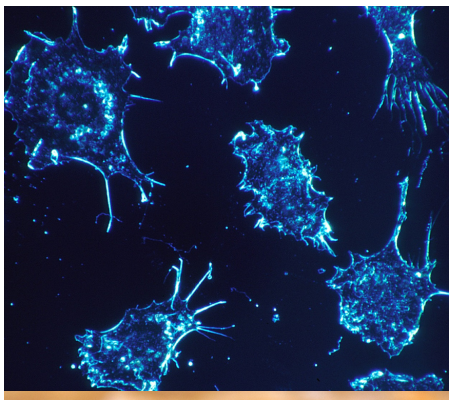
With an aim to nurture skills of all students, the Department of Biotechnology and Bioinformatics, JUIT, has created a platform called Synapse, for students to develop and exhibit their technical, outreach, arts and other skills.

About the name: Atavism is a phenotypic trait that appears suddenly in an organism. Yes, it is that feature we have always had the genes for, but have never expressed. Have you heard of the dolphin with legs or the baby born with a tail? Because if you have, you know what we're talking about!

Just like its name, this newsletter is a little something that we always had the genes for, but we never expressed. We agree that the newsletter isn't as weird as the chicken with teeth but it sure is something out of the blue to bring all of us at Department of BT & BI together. We aim to make this newsletter the place you can go for the latest news in the biotechnology world, bizarre but true science headlines, and conversations that you should hear more of.

HONEY BEE VENOM MAY SOON BE USED TO TREAT AGGRESSIVE BREAST CANCERS

Honeybee Venom has shown anti-tumoral properties in non-small-cell lung cancer, glioblastoma, leukemia, ovarian, cervical, and pancreatic cancers. Australian researchers have utilised this knowledge to see if the venom can be used to treat breast cancer that is very hard to treat by conventional therapies and drugs.



Through their research, scientists were able to show that the venom, and melittin (a compound found in the venom), does destroy breast cancer cells and that too by a significant amount. What's even more interesting is that the findings have been reported in Triple Negative Breast Cancers (TNBCs) and HER-2 enriched breast cancers, both of which are highly aggressive.

This research could open up new avenues for apitherapy and who knows we may have a cost-effective cancer treatment very soon! You can read the whole paper here.

References & Photo credits:

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Of vaccines, herbal medicines and more!

Herbal ways to tackle COVID-19!

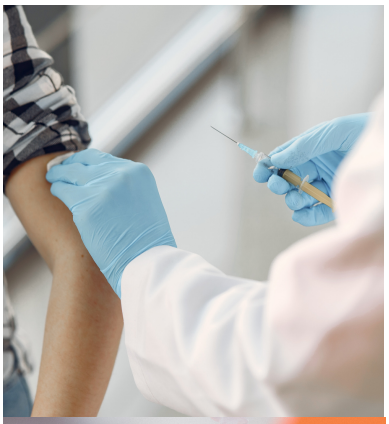
More than eight months into the pandemic, we have not been able to find a drug that has been completely effective against the coronavirus.
Although a lot of research hasn't been published yet, the herbal modes of tackling this virus are working wonders. The Ministry of AYUSH, Government of India, has recommended that including herbal decoctions, turmeric and chyawanprash in our diets can help boost immunity.

Moreover, a team of Siddha doctors (from Tamil Nadu) have also stated that the Kabasura kudineer decoction can effectively manage COVID-19. Kabasura kudineer is a herbal concoction that has ingredients like ginger, pippali, clove, cirukancori root, mulli root, kadukkai, ajwain and many other herbs.

Many herbal medicines and extracts (from ginger, tea tree and eucalyptus among others) have already been found effective against the various viruses, including the SARS-CoV-1.

VACCINE RACE: ASTRAZENECA PUTS THE TRIALS ON HOLD AFTER AN ADVERSE REACTION

The Phase 3 trials for the Oxford-AstraZeneca vaccine, which had begun in late August, have been put on a temporary halt after one of the participants in the U.K. suffered an adverse reaction. One of the frontrunners of the vaccine race, this vaccine using the adenovirus vector and gene for a SARS-CoV-2 protein may now come a little later than expected. The latest update says that the trials will soon resume because an independent review has determined that the adverse reaction was not due to the vaccine.



NOT TO MOVE FOR APPROVAL UNTIL ADEQUATE DATA IS PUBLISHED, SAY CEOS

A joint pledge has been signed by the CEOs of AstraZeneca, BioNTech, GlaxoSmithKline, Johnson & Johnson, Merck, Moderna, Novavax, Pfizer and Sanofi, which says that the companies will move the FDA for Emergency Use Authorization (EUA) only after the complete Phase 3 data is published.
This move comes after the US President Trump hinted that a vaccine could be arriving in October, just in time before the November election. An interesting perspective on the issue has been published in the New England Journal of Medicine and you can read it here.

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OPINION: Why CRISPR cannot be a breakthrough?

CRISPR, or Clustered Regularly Interspaced Short Palindromic Repeats, is a gene-editing technology and has been hailed as the game-changer since its discovery. Used by bacteria as a defence mechanism, it has been almost a decade since scientists found out that this technique could be used to edit the genomic DNA of human cells and possibly cure diseases and suffering.

The CRISPR technique relies on the Cas9 protein and two RNA sequences, one of which serves as the guide RNA for gene editing. This guide RNA binds with the genomic DNA, allowing the Cas9 protein to make precise cuts to the genomic DNA. These cuts allow us to replace a mutated gene with a fully functional gene and the fact that CRISPR can be used to modify multiple genes at the same time makes it even better. Although the above narrative on CRISPR gives us hope, the ay things have turned out has us finding out that there are more problems with CRISPR than we ever anticipated!

CRISPR IS NOT THAT PRECISE!

One of the reasons CRISPR was labelled as a breakthrough was because it allowed for very precise editing of the genomic DNA. But, as more studies are being done on the CRISPR, researchers are realizing that this Cas9 system produces many unwanted edits. There are concerns that the Cas9 proteins could cut the DNA at unexpected places and cause unwanted mutations leading to cancer.

CRISPR BABIES AND EUGENICS!

It was always known that CRISPR could give rise to a different form of eugenics (allowing only humans with the desired characteristics to reproduce) and cause discrimination. But, this thought was largely disregarded most of the times by researchers until the news of Chinese scientist developing CRISPR babies resistant to HIV surfaced in 2018. What's even more concerning that there is a very large possibility that widespread use of gene editing technology would lead to a repeat of the eugenics movement that gained momentum in America in the early twentieth century.

The CRISPR Patent Battle!

In 2012, Jennifer Doudna of UC Berkeley and Emmanuelle Charpentier of Umeå University showed how CRISPR could be used to modify any segment of DNA. A few months later, a team of researchers including Feng Zhang from the Broad Institute, published their reports on genome editing in mouse using CRISPR.

While the UC Berkeley team applied for a patent much before the Broad Institute, the Broad Institute applied for a fast-track process. Since then, the Broad Institute and the University of California, Berkeley, have engaged in a legal battle over who owns the CRISPR technology. While the European Patent Office has granted UC Berkeley the ownership, the US Patent rulings have been in the favour of the Broad Institute as they have declared that the CRISPR editing in mammalian cells (Broad Institute) and the CRISPR editing for genomic DNA (UC Berkeley) are different.

And this has led to both the institutes sub-licensing different biotech companies for commercial use of the technology. We know not how long this battle will last, but we know that there is going to be a lot of problems when a CRISPR therapy for humans will be available for treatment.

References & Photo credits:
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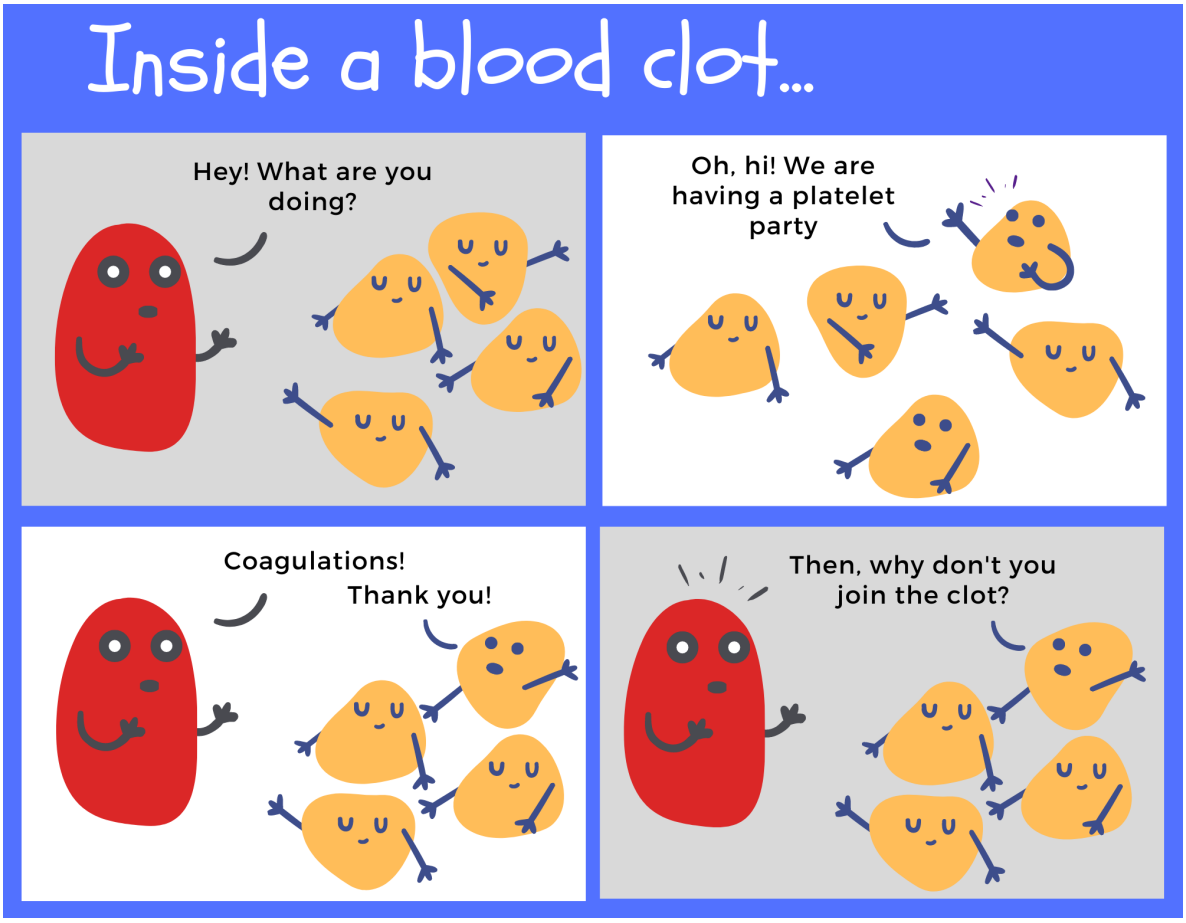
Looking back: Polymerase was once a poor name!

If you know even a tiny bit about molecular biology, you're sure to know what DNA polymerase is and how it was discovered by Arthur Kornberg in 1956. But did you know that the first two scientific papers describing the enzyme and its activity were rejected by the Journal of Biological Chemistry? Yes, there were even some critical comments saying "It is very doubtful that the authors are entitled to speak of the enzymatic synthesis of DNA"; "Polymerase is a poor name"; "Perhaps as important as the elimination of certain banalities...". Only after the editor-in-chief's intervention were that these papers were finally accepted and published in 1957.

And you would be surprised to know that even Kary Mullis's paper on PCR (Polymerase Chain Reaction) was first rejected by the journal Science. Mullis talked about the rejection in his Nobel lecture, where he also talked of how the invention of PCR happened. So, if you're free this weekend, why not read or listen to his lovely Nobel Lecture? You can find it here.

Even Hans Krebs, after whom the Krebs cycle was named, had his paper on Krebs cycle rejected by Nature, simply because they had no space to publish it. Although we are no experts who can comment on scientific publishing, we cannot stop thinking about how biological research would look like today if these papers hadn't been published!

HUMOUR



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