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BIOTECH EXPRESS

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Editorial

Science, PseudoScience, Religion and Beliefs: An Indian Scenario

By Dr Seema Pavgi Upadhyay

India's oldest scientific gathering Indian Science Congress (ISC) is gaining much attention worldwide these days, not only because breakthrough discoveries are coming out of sessions but also because we have started to take dig the past for more imaginative thinking. Many call it Indian Science and many call it PseudoScience. In this article we will see as much detail as possible to understand Science, Pseudoscience, Non Science, Religious beliefs and current scenarion in Indian perspective in Science.

In this way in future, we can think of a special session in each event which will focus on Sci-fi, so that interested people would discuss what they think beyond reality and how it can come near to reality.

The protest came out immediately and could not halt even for conclusion of the event ''106th Indian Science congress" which was held on 4-7th January 2018 in Lovely Professional University. India's oldest event for Science people is gaining much attention in past few years because of some statement coming out from some speakers, according to some science people of the country.

The protest was started on Sunday Morning of 4th January in IISc by some highly irritated Scientists whom which March for Science, a science society was looking furious as its member Prajval Shastri, a retired pro-

fessor from the Indian Institute of Astrophysics who joined the protest on Sunday made agitated statements against people who promoted pseudoscience in 106th ISC. The protest came immediately after the comments on Friday, by Andhra University vice-chancellor G Nageswara Rao, who claimed at one session that the Kauravas from the Mahabharata were test-tube babies, that Ravana, from the Ramayana, possessed 24 aircraft and that Sri Lanka at the time had airports. Prajval Shastri recalled, 'ISC has lost its charm and became a circus", was said by Venkatraman Ramakrishnan once. ISC in its current event could not attract big names out of every corner of India like it used to earlier. But it continues to be a high-profile event because it has the government's endorsement and funding, she said. Inaugurated by the prime minister, it invites well-known scientists, even Nobel laureates, from abroad.

Similar pseudoscientific comment were made earlier also in previous events like told by Rajani KS, the organisation's Karnataka state secretary to an online news. At the 102nd edition in Mumbai that year, a speaker who had retired from a pilot-training school, claimed Indian invented aeroplanes 7,000 years ago. "The first time it happened, we ran an online petition and we also submitted a memorandum to the president of the Indian Science Congress," said Rajani. "The president that time said there were many committees and that one let these papers slip due to oversight." But every science congress since has drawn public attention less for science and more for such statements.

"At the 103rd Science Congress in Mysore, one paper said if you sit on a tiger skin and do Yoga, you don't grow old or can reverse the process of ageing," said Rajani. "We had protested then as well – right in front of University of Mysore." The next one at Tirupati was "full of religious content" and the next at Imphal had the science minister Harsh Vardhan attributing to Stephen Hawking a comment on the Vedas containing a better theory than Albert Einstein's theory of relativity. "Most scientists are ashamed and feel this will make Indian science a butt of jokes," added Rajani. "Already a recent survey has shown that there are only 10 Indians on the list of 4,000 most highly-cited scientists compared to over 400 from China – this is ridiculous."

Principal Scientific Advisor to PM, India also wrote a full fledged article "Pseudoscience: Gorillas are Out" showing his anger toward thinking of some of the leaders of the country. Although he did not quote anyone but the act by him gave us all a strong message that it is time to think again what can be Pseudoscience and what cannot?

What is PseudoScience and how it is different from Science?

To understand Science and to differentiate it with Psudoscience we need to understand first the differences between two. According to Scientific American Magazine, Distinguishing between science and pseudoscience is problematic. In his 2010 book *Nonsense on Stilts* (University of Chicago Press), philosopher of science Massimo Pigliucci concedes that there is "no litmus test," because "the boundaries separating science, nonscience, and pseudoscience are much fuzzier and more permeable than Popper (or, for that matter, most scientists) would have us believe."

Science - Science is defined as the observation, identification, description, experimental investigation, and theoretical explanation of natural phenomena. Whereas, PseudoScience is a discipline or approach that pretends to be or has a close resemblance to science (www.collinsdictionary.com).

Examples of PseudoScience are Astrology , Homeopathy, Creation science, Crop circles, Ufology, Aromatherapy, Applied Kinesiology, Magnetic therapy, The Bermuda Triangle, Meditation, Polygraph testing and many more.

Interestingly, in one negative context of pseudo-sciences, the late scientist Carl Sagan made an insightful observation of using them as tools for arousing scientific interest in the otherwise dull curriculum:

As per his writing, If science is presented poorly in schools and the media, perhaps some interest can be aroused by well-prepared, comprehensible public discussions at the edge of science. The mythological extravaganza and the poetic hyperbole of ancient Indian epics with their astounding weapons and intelligent apes and flying machines can definitely help an eager mind to break free and imagine widely. Hindu mythology can be a fertile teaching aid to make young minds get acquainted with every wild idea that comes up in science: parallel universes to time travel to extraterrestrial life.

Global examples of PseudoScience in history and cultures

Among the most notable developments in the history of pseudoscience in the 19th century are the rise of Spiritualism (traced in America to 1848). During 2006, the U.S. National Science Foundation (NSF) issued an executive summary of a paper on science and engineering which briefly discussed the prevalence of pseudoscience in modern times. It said, «belief in pseudoscience is widespread" and, referencing a Gallup Poll, stated that belief in the 10 commonly believed examples of paranormal phenomena listed in the poll were "pseudoscientific beliefs". (*Science and Engineering Indicators 2006*, Arlington, VA: National Science Foundation)

Traditional Chinese medicine (TCM) is a style of traditional medicine based on more than 2,500 years of Chinese medical practice that includes various forms of herbal medicine, acupuncture, massage, exercise, and dietary therapy. A *Nature* editorial described TCM as «fraught with pseudoscience", and said that the most obvious reason it hasn't delivered many cures is that the majority of its treatments have no logical mechanism of action.

Homeopathy or homœopathy is a system of alternative medicine created in 1796 by Samuel Hahnemann (Germany). Homeopathy is a pseudoscience – a belief that is incorrectly presented as scientific. ("A systematic review of systematic reviews of homeopathy". *British Journal of Clinical Pharmacology*. 54 (6): 577–82. doi:10.1046/j.13652125.2002.01699.x. PMC 1874503. PMID 12492603)

There are many more examples but the three we have discussed are from the top 3 economical and scientific advance economies i.e. USA, China and Europe.

Current agitation for PseudoScience in India

In India the term Pseudoscience has given to some beliefs by Principal Scientific Advisor of India to the people who are taking examples of Hindu Mythology as a ground of Scientific imagination and inventions. The stage was created by Prime Minister Narender Modi as quoted by newspapers and ever since then statements are coming which are unscientific, according to some researchers.

We will discuss here what was discussed and how it was communicated. We are not only discussing about PseudoScience but also the Indian Science because some form of PseudoScience is present on every continent and in every culture, like discussed in examples above.

Example 1: In 2014, at the inauguration of a hospital in Mumbai, he related the successful implant of an elephant's head on Lord Ganesh to the superior knowledge of cosmetic surgery among the ancients. There might have been some plastic surgeon at that time who got an elephant's head on the body of a human being and

began the practice of plastic surgery. In the same speech he said, Karna in Mahabharata, who was not born of his mother's womb, might have been a living example of stem cell technology thousands of years ago. In 2018, Prof Nageshwar Rao, VC of Andhra University cited example of 100 son of Kauravas where he emphasized the use of stem cell technology again.

Xenotransplantation (interspecies graft) can be an answer to the first example of PM's statement about cosmetic surgery. According to FDA, Xenotransplantation is any procedure that involves the transplantation, implantation or infusion into a human recipient of either (a) live cells, tissues, or organs from a nonhuman animal source, or (b) human body fluids, cells, tissues or organs that have had ex vivo contact with live nonhuman animal cells, tissues or organs. However any example of successful Xenotransplantation of organs is still a fantasy like Modi's statement on cosmetic surgery, but that does not stopping researchers to do more research in Xenotransplantation.

Similarly, birth of Karna in Mahabhatra seems not impossible by stem (or any other) cell technology which might had been practicized in past in different unknown way or if not then atleast our ancestors could think of this much development of Science and an ancient cloning done in a way like done for "Dolly The Sheep". Today we all know that all we need are gametes, fertilization and gestation atmosphere, the former two we have achieved, embryo outside the body has been created which can be transplanted in uterus in surrogate mother through IVF.

Example 2: In 2017, at the inaugural session of the 105th Indian Science Congress, Union Minister for Science & Technology Dr. Harsh Vardhan said "Each and every custom and ritual of Hindus is steeped in science and every modern Indian achievement is infact a continuation of our ancient India's scientific achievements. We recently lost a renowned scientist, renowned cosmologist Stephen Hawking. He also emphatically said on record that our Vedas might have a theory which is superior to Einstein's theory of E=mc^2".

However, we could not find proof of this citation but we could find love of Stephen Hawking for Hindu Vedas. In his book ''A Brief History of Time", cosmologist Stephen Hawking wrote, It is not surprising, given the many creation myths from around the world and from different ages, that our modern scientific theories of cosmogenesis should have some resemblance to one or another of these earlier stories of the origin of the universe. Two years ago, while selecting texts for a course exploring the religious quests of people from prehistoric times down to the present, I came across the Nasadiya Sukta in the Hindu Rig Veda and the sage Uddalaka Aruni's instruction to his son Svetaketu in chapter 6 of the Chandogya Upanishad and was struck by the similarities of these two ancient cosmogonies, especially that of Uddalaka Aruni, to our modern scientific creation story, the expanding universe theory, which is popularly known as the big bang theory.

Example 3: Dr Harsh Vardhan has also said India will demonstrate to the world the importance of the cow by carrying out verifiable scientific research into benefits derived from 'panchgavya' or five elements of the cow.

According to Dhama K et. Al., the ancient ayurvedic literature (Vir Charak Samhita, Sushrut, Gad Nigrah) suggests a number of pharmacological applications of the substances obtained from Panchgavya. These substances are abundantly used in Ayurveda for treatment of several disorders such as leucoderma, hyperlipidemia, arthritis, renal disorders, dietary disorders, gastrointestinal track disorders, acidity, asthma etc. These remedies seem to be potent anticancer and anti HIV agents.

Example 3: Former Uttarakhand Chief Minister and current BJP MP Ramesh Pokhriyal shared his thoughts inside the parliament. Pokhriyal not only was sure that there was advance medical science in ancient India, but further went on to claim that an ancient sage, Kanad, who is believed to have lived around the 2nd century BC, had conducted a nuclear test during his time.

On analyzing this claim we could not find any evidence for the testing of atomic bomb, however we could find that that the atomic theory of Acharya Kanad though may not be considered empirical, but its official place in the field of modern science is still heavily debated, its philosophical and cultural merits cannot be disputed. Though his theory of the atom was abstract and leaned towards philosophy and logic than personal experience or experimentation, it is praised even in modern times as a brilliant and imaginative explanation of the physical structure of the world and for largely agreeing with the discoveries of modern physics.

Example 4: Former Mumbai Police Commissioner and current MoS Human Resource Development Satyapal Singh said was the first to invent the airplane eight years before the Wright brothers.

We found that Talpade's airplane was named *Marutsakhā*, derived from the Sanskrit *Marut* ('air' or 'stream') and *sakhā* (‹friend›) which together mean ‹Friend of wind›. As suggested by D. K. Kanjilal's 1985 (before 1903) *Vimana in Ancient India: Aeroplanes Or Flying Machines in Ancient India*, as well as contemporary reports in the Marāthi-language newspaper *Kesari*, *Marutsakhā* is supposed to have been inspired from Vimāna, ancient flying-machines in Hindu mythology. One of Talpade's students, Pt. S. D. Satawlekar, wrote that *Marutsakhā* sustained flight for a few minutes. According to K.R.N. Swamy "a curious scholarly audience headed by a famous Indian judge and a nationalist, Mahadeva Govinda Ranade and H H Sayaji Rao Gaekwad, respectively, had the good fortune to see the unmanned aircraft named as 'Marutsakthi' take off, fly to a height of 1500 feet and then fall down to earth". The presence of Mahadev Govind Ranade and Sayajirao Gaekwad III during the flight is also cited in «Annals of the Bhandarkar Oriental Research Institute".

Example 5: Dr Satyapal Singh himself, who is incidentally an MPhil in Chemistry discredit Charles Darwin's Theory of Evolution, Singh had the best/ worst logic possible - Nobody saw ape turning into humans.

Discussion on evolution is never ending process. We still are evaluating how Universe was made and thus statement of Dr Singh is just a Democratic view like others.

Example 6: According to Rajasthan Education Minister Vasudev Devnani it was an Indian who came up with the gravitational law first. Brahmagupta II, a seventh century astronomer gave the law of gravitation 1,000 years before Newton.

In our research of literature we found that Brahmagupta is a known name among disciples. According to sources, Aryabhata first identified the force to explain why objects do not fall when the Earth rotates, and developed a geocentric solar system of gravitation, with an eccentric elliptical model of the planets, where the planets spin on their axes and follow elliptical orbits, the Sun and the Moon revolving around the Earth in epicycles. Indian astronomer and mathematician Brahmagupta described gravity as an attractive force and used the term «gurutavakarshan" for gravity.

Sources: Pickover, Clifford (2008). Archimedes to Hawking: Laws of Science and the Great Minds Behind Them. Oxford University Press. ISBN 978-0-19-979268-9, Bose, Mainak Kumar (1988). Late classical India. A. Mukherjee & Co. and Sen, Amartya (2005). The Argumentative Indian. Allen Lane. p. 29. ISBN 978-0-7139-9687-6

Example 7: Assam health minister Himanta Biswa Sarma is of the opinion that people suffer from life-threatening diseases such as cancer because of sins committed in the past which he called «divine justice».

As per our estimates, Divine justice is the topic of religion and has nothing to do with Science. Obviously if you do smoke and drink a lot, these are your sins and you have to suffer but again it is contradictory because people who do not smoke or drink still have cancer.

Example 8: Tripura Chief Minister Biplab Deb came up with the idea that «internet existed in the days of Mahabharata. In Mahabharata, Sanjay was blind but he narrated what was happening on the battlefield to Dhritarashtra anyway. This was due to internet and technology. The satellite also existed during that period," he said.

This also looks contradictory to scientific beliefs because if internet or communication was there then the king would not have any need of messengers who had to travel across the seas by foot or early means of transport. Similarly, if such technologies were there then Lord Hanuman could simply pass the message to Lord Ram via internet instead of coming back to Lord Ram.

Example 9: Gujarat chief minister Vijay Rupani feels Narada Muni from Indian mythology and Google are similar as the sage "was a man of information; who had information of the whole world, he acted on these information, collecting information was his dharma.

This has nothing to do with science but could be a good thought to make a connection between universal information source like Google. It is depicted in Hindu Mythology that Narad Muni had all information of worldly affairs like google is considered now.

Example 10: An education minister of a state went a step ahead, claiming that the cow is the only animal in the world that breathed oxygen in and out.

This is totally wrong and was a mistake of Minister to make such claims. No animal can exhale oxygen.

What to conclude?

Now, here the question is what to take forward instead of blaming who is right or wrong. As pointed out by an unnamed source, we can do three things in light of this chaos, First, As a Scientific mind we need to become inquisitive to know whether the statement has any Scientific possibility, second is to get answer of proposed theory or to leave the things which are beyond our imaginations for other Science people, thirdly and most importantly we should repeatedly ask questions that look pertinent because what was impossible in past, is now possible because of recent advancements in Science.

Although we cannot answer all the questions for what we see around us but certainly things are there which look miraculous. In the article written earlier by Kamal Pratap Singh, editor of Biotech Express Magazine he took various examples that were documented in Hindu Mythology like example of multiple heads if Ravan had or not, today we can see people and even other animals who have two heads and multiple organs, so why it looks pseudo when someone suggest it to us.

Here we all like to promote Indian Sciences like every other country/civilization does, we get very excited-when we see many series on Alliens for just the possibility but we have not seen even a single one on this planet. Similarly, Airplane could have become reality because Leonardo da Vinci made a drawing of it and now we all know very well who is Leonardo da vinci and their other discoveries.

As we are talking about examples, it might was pseudoscience 3-400 years back when some people lost their lives because they tried to make some aeroplanes and vaccines (in 1976) but slowly and gradually an aeroplane came which now can carry 300 passengers in one flight and vaccine came out as wonder which can save millions of people from death around the world.

Science is all about questioning either from new information or existing information and when we are pouring crores of public money then why not ask some questions that may or may not be relevant to science but looks like scientific topics as they have imaginations in right direction. Research is a process where you add brick in a wall and it takes time.

Opinions of PSA to PMO

Dr K Vijayraghavan, Principal Scientific Advisor to the Prime Minister of India on the other hand have criticized the remarks and asked attendees and other Science academies to file a complaint aganist people who are spreading Pseudoscience. Mr. VijayRaghavan said, "When lay people, including politicians, make random and erroneous statements linking religion, culture, history etc, to science, the problem must be addressed by collegial communication. Dr VijayRaghavan, a biologist and a former Secretary of the Department of Biotechnology, listed out examples of how pseudoscience, when it made its way into policy, caused harm. For instance, when former South African President Thabo Mbeki and his health minister Manto Tshabalala-Msiang advocated that HIV didn't cause AIDS, it led to unnecessary loss of lives. The same threat continues to be posed by powerful leaders who deny climate change.

Dr K Vijayraghavan made a statement using a phrase ''Gorillas are outside" which means that there are many out there who think and does science in pseudoscientific way.

On being anonymous one scientist said, outcry of Dr VijayRaghavan looks immature because he is Principal Scientific Advisor to the Govt. of India, if he had some problem then instead of asking others he should have gone to competent authority, and could take appropriate action. In case he is unable to do so then he should resign from the post. Statement of Dr VijayRaghavan seems contrary to the view of Current Govt. as Prime Minister himself has advocated some practices of ancient sciences which can be connected to science. If it comes from the highest Civilian, it raises some concern over firm belief and some attention should be given to some forms of eligible pseudoscience, it can be good food for thoughts like what we discussed by taking example of Carl Sagan. He added, there are many gorillas out there like Lions and Elephants too.

Note 1 from Writer: Pseudo Science is a broad term and we should understand ourselves what to believe and what not in light of evidences. The thin line between Science and PseudoScience depends on many factor like beliefs, evidences, time, etc., So the writer advise readers to understand PseudoScience in your Capabilities. Just for an example Homeopathy is considered as PseudoScience, but according to www.transparencymarketresearch.com, the global homeopathy product market stood at US$3.8 billion in 2015 and is projected to proliferate at a CAGR of 18.2% during 2016–2024. By the end of the forecast period, the market will earn a revenue worth of US$17.4 billion.

Note 2: All views expressed here are of purely writer's view.

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Editorial News

Prof Ashok Pandey among the top global 1% of Clarivate highly cited researchers list

The Name of Professor Ashok Pandey has come up among the top 1% highly cited global researcher from India and only name from CSIR which is largest research organization in the country.

THE TIMES OF INDIA, MUMBAI *
THURSDAY, JANUARY 3, 2019

TIMES CITY

Only 10 Indians on list of world's 4,000 top scientists, but this is double last year's

With 482 Names, China's Presence Third Largest

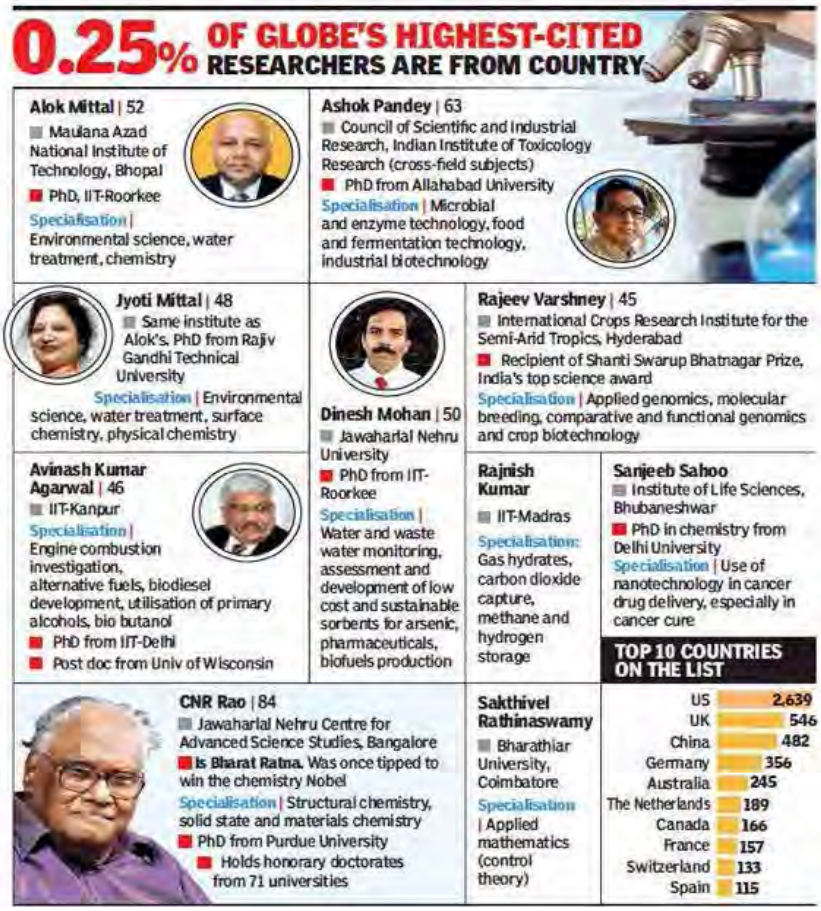
Yogita.Rao@timesgroup.com

India boasts of eminent science and social science institutes like IISc, the IITs, TIFR, JNU and Tiss. Yet, only 10 Indians figure among the world's top 1% highly-cited researchers (HCR) in the two fields. To top it, some of the 10 are not from the country's leading institutes. The list, comprising over 4,000 of the globe's most 'influential' researchers, in its fifth edition, has been released by the firm Clarivate Analytics.

Eminent scientist and former head of the scientific advisory council to the prime minister, CNR Rao, figures on the list. A professor each from IIT-Kanpur, IIT-Madras, and JNU and two from NIT-Bhopal, too, are on the global HCR list, which covers over 60 countries, though more than 80% of the names come from only 10. Remarkably, 70% are from just five countries (see box). Among institutions, Harvard University has the highest representation on the list, with 186 names.

While India's representation is negligible, neighbor China is third on the list, ahead of Germany.

JNU's Dinesh Mohan, who figures on the list, said that till last year, less than five Indians would be on the list. "This year, they have included an additional category of 'cross-field', which took the number to 10," he said. "Citations also depend on the nature of work. Areas such as climate change, water



respect in a country like India, which is obsessed with fundamental research. "We need to improve our research ecosystem... Predatory journals, where you pay and publish, need to be heavily penalised. There is a lack of focus on quality research in Indian academia," he said. "Also, teaching and research are two sides of the same coin. If teachers do not do high quality research, they will not be updated with new developments."

The other Indian names on the HCR list are: Alok and Jyoti Mittal (a married couple; Jyoti is the only woman researcher on the list) from NIT Bhopal; Rajnish Kumar from IIT-Madras; Sanjeeb Sahoo from Institute of Life Sciences, Bhubaneshwar; Rajeev Varshney from International Crops Research Institute for the Semi-Arid Tropics, Hyderabad; Sakthivel Rathinaswamy from Bharathiar University, Coimbatore.

The reasons why India has minuscule representation on the list include socio-economic and cultural factors, the nature of academics in the country and also brain drain. Also, India's top institutes are primarily centres for theoretical research. "The pure science research has become highly specialised. Scientists from pure sciences tend to have a very small peer group. There will not be many researchers from pure sciences even on the global HCR list," said Mayank Vahia, a former TIFR professor who is now the dean of the School of Mathematical Sciences, NMIMS, explaining why researchers from the pure sciences do not have good citation indices. "On the contrary, research in applied sciences is directly related to industry, is of immediate utility value and also has larger reach."

Brief Profile of Professor Ashok Pandey

Professor Pandey is currently Distinguished Scientist at CSIR-Indian Institute for Toxicology Research, Lucknow, India and Honorary Executive Director at the Centre for Energy and Environmental Sustainability- India.

Formerly, he was Eminent Scientist at the Center of Innovative and Applied Bioprocessing, Mohali and Chief Scientist & Head of Biotechnology Division at CSIR's National Institute for Interdisciplinary Science and Technology at Trivandrum.

His major research and technological development interests are in industrial and environmental biotechnology, which span over biomass to fuels & chemicals, waste to wealth/energy, industrial enzymes, solid-state fermentation, etc.

Professor Pandey has ~ 1275 publications/communications, which include 16 patents, 63 books, 650 papers and book chapters, etc with h index of 91 and >36,000 citations (Goggle scholar). He has transferred several technologies to industries and has done industrial consultancy for about a dozen projects for Indian/international industries.

Prof Pandey is Editor-in-chief of Bioresource Technology, Honorary Executive Advisors of Journal of Water Sustainability and Journal of Energy and Environmental Sustainability, Subject editor of Proceedings of National Academy of Sciences (India) and editorial board member of several international and Indian journals.

Editorial News

Clarivate Analytics, the global leader in providing trusted insights and analytics to enable researchers to accelerate discovery, published its annual Highly Cited Researchers (HCR) list. Now in its fifth year, the citation analysis identifies influential researchers as determined by their peers around the globe – those who have consistently won recognition in the form of high citation counts over a decade. The Web of Science serves as the basis for the regular listings of researchers whose citation records position them in the top 1% by citations for their field and year.

"This year, a new cross-field category has been added to recognize researchers with substantial influence in several fields but who do not have enough highly cited papers in any one field to be chosen. For example, an immunologist today is likely both a biochemist and molecular biologist, and a chemist is also a materials scientist and even an engineer. Breaking through the artificial walls of conventional disciplinary categories by the introduction of the new cross-field category aims to keep the Highly Cited Researcher list contemporary and relevant."

Reported online on Firstpost: Dr Ashok Pandey is a researcher at the Indian Institute of Toxicology Research, and the only researcher from Council of Scientific & Industrial Research (CSIR) network of 5,000 Indian scientists to get a spot on the list.

"It is a matter of concern and needs to be addressed by the government, and stakeholders, including scientists," Pandey said about the same to ToI.

Top 10 of India

1. Dr CNR Rao, Professor of Chemistry
Citations 105889

2. Dr Ashok Pandey, Professor, CSIR-IITR
Citations 36330

3. Dr. Dinesh Mohan, Professor, Environmental Sciences, JNU
Citations 25234

4. Rajeev K. Varshney, Research Program Director-ICRISAT
Citations 29053

5. Avinash Kumar Agarwal, IIT, Kanpur
Citations 11754

6. Dr. Alok Mittal, Professor of Chemistry, NIT Bhopal
Citations 10928

7. Jyoti Mittal, Assistant Professor, NIT Bhopal
Citations 6680

8. Dr Rajnish Kumar
Assoc. Prof. Chemical Engineering; IIT, Madras
Citations 4082

9. Dr Sanjeeb Sahoo, Scientist , DBT- ILS, Bhubaneswar
Citations 8,964

10. Dr Sakthivel Rathinaswamy, Bharathiar University
Citations 6706

Key findings of Clarivate Analytics shows:

1. Some 4000+ Highly Cited Researchers are named in 21 fields of the sciences and social sciences. The United States is home to the highest number of HCRs, with 2,639 authors. The United Kingdom boasts 546. China (mainland) is gaining fast with 482. Harvard University keeps its pole position on the list.

2. Among the 4,058 researchers named as Highly Cited in the 21 Essential Science Indicator (ESI) fields, 194, or 4.8%, appear in two ESI fields. An elite 24 researchers, hailing from North America, Europe, Asia, and the Middle East, appear in three fields.

3. New for 2018 – approximately 2,000 additional researchers have also been identified as having exceptional performance based on high impact papers in several fields. Nations or regions with more than 40% of their Highly Cited Researchers selected in the cross-field category are Sweden (53%), Austria (53%), Singapore (47%), Denmark (47%), China (43%) and South Korea (42%).

4. This year's list continues to recognize researchers whose citation records position them in the highest ranks of influence and impact: it includes 17 Nobel laureates, including two announced this year: James P. Allison, Physiology or Medicine, and William D. Nordhaus, Economic Sciences. Also included are 56 Clarivate Analytics Citation Laureates – individuals who, through citation analysis, we have identified as researchers 'of Nobel class' and potential Nobel Prize recipients.

5. Australian research institutes continue to impress; the number of researchers recognized as Highly Cited has more than doubled in four years, from 80 in 2014 to 170 in 2018, among those selected in one or more of the 21 fields. Australian research institutions appear to have recruited a significant number of HCRs since 2014 as well as increasing their number of homegrown HCRs.

6. China (mainland) continues to march its way up the list and has overtaken Germany to reach the third spot on the top 10 country/region list.

7. Governmental research institutions also feature prominently with the US National Institutes of Health, the primary agency of the United States government responsible for biomedical and health-related research, appearing second in the list of Highly Cited Researchers. The Chinese Academy of Sciences and the Max Planck Society also both feature in the top 10.

8. The Highly Cited Researchers represent more than 60 nations, but more than 80% of them are from the 10 nations listed in the table below and 70% from the first five – a remarkable concentration of top talent.

About Web of Science

Web of Science connects publications and researchers through citations and controlled indexing in curated databases spanning every discipline. Use cited reference search to track prior research and monitor current developments in over 100 year's worth of content that is fully indexed, including 59 million records and backfiles dating back to 1898. Web of Science is maintained by Clarivate Analytics (previously the Intellectual Property and Science business of Thomson Reuters, that provides a comprehensive citation search. It gives access to multiple databases that reference cross-disciplinary research, which allows for in-depth exploration of specialized sub-fields within an academic or scientific discipline.

News in Focus

Research scholars across the country are protesting again to increase their stipend

According to Nikhil Gupta, national representative of Research Scholars of India, an association leading the petition, the MHRD had promised regular revisions in 2015. Gupta is a research scholar at the Centre for Biomedical Research, Lucknow. Aditya Chandel, a PhD student at IIT Madras, agreed. “The current emoluments make it very difficult for us to survive in big metropolitan cities. Some researchers get their stipends after every three or six months. How are we to pay for their tuition every semester, and complete their projects, besides taking care of their living expenses?”

Inflation alone – if not other forces – is driving up tuition fees, hostel charges, mess charges and travel expenses. Students are also expected to bear the costs of attending conferences out of their pockets, Gupta and other scholars have said.

Photo: HRD Mr Prakash Javadekar (in centre)

After over 400 research scholars held a silent protest holding placards outside the Department of Science and Technology, New Delhi, the DST officials have announced to set-up a new committee which will ensure regular disbursal and revision of fellowship funds. The committee, said the officials, will also ensure that the stipend of researchers is increased at regular intervals and ensure smooth disbursal of research funds.

Research scholars from all across Indian educational institutes including IITs and IISc were on a hunger strike demanding a hike in their stipend, timely disbursal of funds and an annual inflation-based increment on their stipends. Over 40 research scholars went on a day-long hunger strike on December 21. Other institutes also held protests in their campuses, IISc students created a human chain and many ran a social media campaign #HikeResearchFellowship. Moreover, the research scholars also sent over 5,000 signatures to PMO, DST, UGC and MHRD. Over 400 postcard stating students' demands also reached PMO last week.

The researcher scholars met secretary, DST Ashutosh Sharma and adviser, scientist, DST, A Mukhopadhyay. During the meeting, the officials assured the research scholars that the stipend will be eventually increased. Sharma told researchers, "The stipend will be increased and an official notification regarding this will be issued soon." Officials also ensured a "reasonable percentage" hike of the stipend.

The researchers have been demanding to double their stipend which is currently Rs 25,000 for JRF fellows and Rs 28,000 for SRF fellows to be increased to Rs 50,00 for JRF and Rs 56,000 for SRF scholars.
Research scholar at IIT Delhi, Vickey Nandal said, "We will wait for the official notification till mid-January. If our demands are not accepted, we will hold protest again and at a larger scale, this time it will be outside MHRD."

Student Delegation also met Hon'ble Union Minister for HRD Mr Prakash Javadekar on 26th December 2018:

Taking the Stipend Hike Movement at a new level, Students' representatives are approaching the respective authorities to put the demands of stipend hike, periodic increment and timely disbursal forward. On 26th December students from IISc, IIT Delhi, IIT Kanpur, JNU, Delhi University, AIIMS and few other research institutes met Mr Prakash Javadekar, Hon'ble Union Minister for HRD.

The members of the delegation raised the following primary demands:
1. Fellowship hike by at least 80%.
2. The periodic increment in the fellowship.
3. Regular and timely disbursal of the stipend.
4. Setting up of the Grievance Redress and Monitoring System (GRMS) to address the problems that Research Scholars face in their student life cycle.

The minister assured us the following:
1. A significant hike in the research stipend soon.
2. Provision of periodic increment will be taken into consideration.
3. Timely disbursal of the stipend will be implemented.
4. Setting up of GRMS (or such channel) will be taken into consideration.

Apart from this, the discussion spanned over the need of stipend hike with an adequate increment along with the need for improvement in the overall research ecosystem.

Press Release

Univercells Introduces Breakthrough Vaccine Manufacturing Platform

Univercells and consortium partner Batavia Biosciences have been awarded a $4 million grant extension by the Bill & Melinda Gates Foundation to scale up their low-cost polio vaccine manufacturing technology.

Nivelles, BELGIUM – January 11, 2019 – Univercells, a business-to-business provider focused on increasing the availability of affordable biologics to address global health challenges, announced today the commercial launch of its proprietary NevoLine™ bioproduction system for vaccines. The system was initially developed as part of a $12M Grand Challenges grant awarded by the Bill & Melinda Gates Foundation to deliver affordable inactivated polio vaccine (sIPV). Leading the consortium, Univercells was responsible for the NevoLine system, Batavia Biosciences for the polio manufacturing process, and Merck for the purification membrane. After attaining its goals of delivering a very low Cost of Goods for an sIPV below $0.30 per trivalent dose, the consortium has now received a $4M grant extension to scale-up the manufacturing system and process in preparation for clinical and commercial application. The first NevoLine system will be installed in Batavia Biosciences' polio dedicated Biosafety level 3 Facility in Leiden, the Netherlands.

Based on a novel process architecture, Univercells designed the automated NevoLine bioproduction system that facilitates safer, faster and closed bioprocessing in a much smaller footprint. Through intensification and chaining of unit steps into a continuous process, users achieve high yields with less time and money invested. The sIPV production process using the NevoLine system is capable of producing trivalent sIPV at less than $0.30/dose, representing a five-fold reduction compared to current manufacturing technologies.

"This challenging two-year project aimed at delivering a new manufacturing system to drastically decrease cost, footprint and time to market for vaccine manufacturers, and we are pleased to have met these goals," Hugues Bultot, CEO and co-founder of Univercells said. "The NevoLine system is

self-contained into a 6m^2 series of isolators. A facility designed with four NevoLine units would deliver up to 50 million sIPV doses per year for an estimated capital cost of $20M. These breakthrough achievements further strengthen our dedication to innovating flexible, scalable and accessible vaccines and biotherapeutics manufacturing solutions."

Dr. Pierre A. MORGON, Non-Executive Director and Advisor to the CEO, added: "Since my first stint in the vaccine industry in 1986, I have seen few technological breakthroughs bringing a genuine opportunity to change the fundamentals of vaccine manufacturing. The technology developed by Univercells heralds a new era in vaccine production. The massive reduction of the upfront capital investment and of the manufacturing footprint required for bulk vaccine and biotherapeutics production will shake the markets to their foundations and enable greater competition by lowering barriers to entry. Public health stands to gain handsomely from these new market dynamics, with biotherapeutics and vaccines being available in large enough volumes and at affordable prices".

Univercells remains more than ever dedicated to developing turnkey solutions for a series of vaccines and biotherapeutics, to be delivered at an affordable price.

News in Focus

Five Day 106th Session of Indian Science Congress Concludes in Jalandhar

The 106th session of Indian Science Congress (ISC), 2019 concluded in Lovely Professional University, Jalandhar today. The five-day session was inaugurated by Hon'ble Prime Minister ShriNarendraModiand attended by Union Science &Technology Minister Dr. Harsh Vardhanon 3rd January, 2018. As a part of the Indian Science Congress, Women's Science Congress was held which was inaugurated by Union Minister for Textiles & Industry Smt. SmritiZubinIraniand concluded by Union HRD Minister ShriPrakashJavadekar. Science Communicators' Meet was inaugurated by Minister for Electronics & IT Shri Ravi Shankar Prasad. The Children's Science Congress was inaugurated by the Nobel Laureates AvramHershko from Israel and F.DuncanM. Haldane from USA.

During five days, significant lectures from three Nobel Laureates; 20 Plenary Sessions & several sectional symposia with top authorities from DRDO, ISRO, DST, ICAR, CSIR, ICMR, AICTE, NAAC, UGC, ISCA, the USA, UK Universities, were attended bynearly 30,000 participants.More than fifteen thousand delegates participated at this scientific meet.

An exhibition 'Pride of India' was also held during the event wherein 150 organisations including DRDO, DST, Min/o Earth Sciences, CSIR, ICAR, ICMR, NPCIL, and various other scientific departments and universities participated. The major attractions of the exhibition were the replicas of Akash Missiles, Brahmos missiles, GSLV-MK III, Astrosat satellite, INSAT-4A, IRNSS Satellite. The major attractions were the 55-feet, 25-ton massive robot 'Metal Magna' installed at the entrance gate. A giant microscope and a trainer plane were also displayed. During the ISC, a solar-powered driverless bus designed and created by the students of Lovely Professional University was also inaugurated. A Time capsule with items representing today's technology and India's scientific prowess was buried to be opened after 100 years.

The event played a vital role in stimulating scientific research effort and raising the scientific temperament in the country and the world. During concluding ceremony, 37 awardees in the categories of Young Scientists, Best Poster presentation and Pride of India-Science Exhibition were honoured. The event at LPU, which commenced with lighting of 'VigyanJyot', was handed over to General President elect for 2019 K S Rangappa for organization of 107th ISC. While making concluding remarks of the event, General President, Indian Science Congress Association (ISCA) 2019, Dr Manoj Kumar Chakrabarti highlighted that 106th edition of ISC provided the best platform to exchange ideas and innovations among scientists gathered from across the world.He also applauded the invaluable contribution of Indian Scientists and all at different events of ISC-2019, particularly the scientific temperament of people of Punjab who participated in huge numbers.

6th AIST International Imaging Workshop

January 20-27, 2019

Biomedical Research Institute (https://unit.aist.go.jp/bmd/en/)
National Institute of Advanced Industrial Science & Technology (AIST)
1-1-1 Higashi, Tsukuba Science City 305 8566, Japan

The AIST International Imaging Workshop is a residential one-week course held at the Biomedical Research Institute, AIST offering a wide range (from the principles of light microscopy to super resolution imaging) of microscopy training to young talented researchers. Participants will be trained through hands-on practical sessions in several critical and important issues related to imaging technologies.

Who can join?

The course is suitable for both beginners and experienced users wanting to gain a greater understanding of the microscope. Students are selected through recommendation from their supervisor internationally from a range of backgrounds. Preference will be given to doctoral level students. The course will have a maximum of 20 delegates.

Language?

The course, including the course materials, will be conducted in English.

Support?

Selected candidates will be provided (1) Airfare (return) by economy class through the most direct route from the international airport in their home country to Japan, (2) Limousine fare (return) from Narita International Airport to Tsukuba Center, (3) Single room accommodation at the AIST Guest House and (4) Allowance to cover the daily meals.

Course Details

Laboratory Course 1: Basic training in Microscopy
Anatomy of the light microscope, Basic optics, Lenses, Bright field, Phase contrast, DIC, Fluorescence, Fluorochromes and Filters, Fluorescence imaging, Basic microscope maintenance

Laboratory Course 2: Basic training in Laser Scanning Microscopy
Learn the basic technique for a confocal microscopy, including spectral imaging, photo-activation, calcium imaging etc.

Laboratory Course 3: Training in the latest microscopic analysis
Learn the principle and techniques of recently-developed novel microscopic technologies, such as Super-resolution Microscopy, FCS analysis, Electron Microscopy, and so on..

Laboratory Course 4: Training in Bioluminescence Screening & Imaging
Learn the principle and techniques in high throughput screening & cell imaging based on bioluminescence technology

Program

January 20 - *Arrival, Reception & Networking*

January 21 - *Orientation; Lectures on Basic Principles of Microscopy*

January 22 - Course 1: *Basic Training in Microscopy*

January 23~25 - Course 2: *LSM*
Course 3: *Latest Microscopic Analyses*
Course 4: *Bioluminescence Screening & Imaging*

January 26 - *Tour to Microscope Companies in Tokyo & Around*

January 27 - *Departure*

Instructors: Y. Ohmiya, K. Katoh, T. Ebihara, T. Ochiishi, Y. Sasaki, K. Kiyosue, T. Tomita, Y. Shinkai, H. Inagaki, K. Ogawa and M. Doi

Organizers: Y. Ohmiya, R. Wadhwa, Y. Onishi, M. Doi and S. Kaul

Sponsors: Nikon, ATTO, Hamamatsu Photonics, Olympus and Zeiss

Deadline for application - September 15, 2018

For further information:
s-kaul@aist.go.jp

National Institute of Advanced Industrial Science and Technology
AIST

バイオメディカル研究部門
Biomedical Research Institute

DBT-AIST International Laboratory for Advanced Biomedicine
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Transchymal-AD is Human fat derived primary pluripotent stem cell aggregate model that can predict test chemical's safety and efficacy invitro

Trans-HSC is Human Umbilical cord derived primary hematopoietic stem cell aggregate model that can predict test chemical's safety and efficacy invitro

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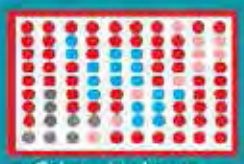
Name:	
Source	Human Cord Tissue Matrix
Trade Name:	Transchymal™
ID:	Transchymal-CTMSC-134/R
Cells Harvested Date	
Passage No:	
Biosafety Level	1
Organism	Homo sapiens (Human)
Growth properties:	Adherent
Age:	Lot Specific
Morphology	Spindle-Shaped, fibroblast-like
Gender	Lot Specific
Volume/Vial:	5ml (2.3 million cells / 1ml)
No: of Vials	As required
Viability	≥92%
Population Doubling Capacity:	≥ 10 in complete growth medium and support differentiation
Shipped	Frozen
Storage	Liquid nitrogen or for short term storage at -80°C
Quality Assurance:	
Testing	Tested for CD73, CD90, CD105, CD34, and CD45. Primary cells display normal karyotype as assessed by G-banding of 20 metaphase cells.
Sterility Tests	Bacteria & Yeast : Negative Mycoplasma: Negative Endotoxin: Negative

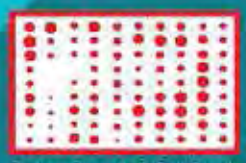
Transchymal + Test compound



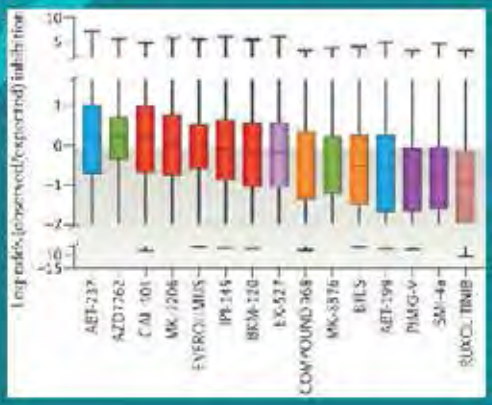
Colormetric Assays

Turbidity Measurements

Cell Marker Expression



Colony Growth & Cell Death



Transchymal Use Case

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NEWS: Govt & Industry

PM delivers inaugural address at 106th session of Indian Science Congress

The Prime Minister, Shri Narendra Modi, delivered the inaugural address at the 106th session of the Indian Science Congress. Reflecting on the theme of the event this year - 'Future India: Science and Technology' - the Prime Minister said that India's true strength will be in connecting its science, technology and innovation, with its people.

He recalled the great Indian scientists of the past, including Acharyas J.C. Bose, C.V. Raman, Meghnad Saha, and S.N. Bose, and said that they served the people through "minimum resources" and "maximum struggle."

"The life and works of hundreds of Indian Scientists are a compelling testament of integration of deep fundamental insights with technology development and nation-building. It is through our modern temples of science that India is transforming its present and working to secure its future," the Prime Minister said.

The Prime Minister recalled our

former Prime Ministers Shri Lal Bahadur Shastri ji and Shri Atal Bihari Vajpayee ji. He said that Shastri ji gave us the slogan: "Jai Jawan, Jai Kisan," while Atal ji added "Jai Vigyan" to it. He said that now the time has come to take a step further, by adding "Jai Anusandhan."

The Prime Minister emphasized that the pursuit of science is fulfilled through the achievement of two objectives: generation of profound or disruptive knowledge; and use of that knowledge for socio-economic good.

As we boost our discovery science ecosystem, we must also focus on innovation and start-ups, the Prime Minister said. He said that the Government has launched the Atal Innovation Mission to promote innovation among our scientists. More Technology Business Incubators have been established in the last four years than in the forty years before that, he added.

"Our Scientists must commit themselves to addressing problems of affordable healthcare, housing, clean air, water and energy, agricultural productivity and food processing. While Science is universal, technology must be local for providing solutions relevant to local needs and conditions," the Prime Minister said.

The Prime Minister said that big data analysis, artificial intelligence, block-chain etc should be utilised in the agricultural sector, especially to help the farmers with relatively small farm-holdings.

He urged the scientists to work towards ease of living for the people. In this context, he mentioned issues such as drought management in low rainfall areas; early disaster warning systems; tackling malnutrition; tackling diseases among children such as encephalitis; clean energy; clean drinking water; and cyber security. He called for time-bound solutions through research, in these areas.

The Prime Minister mentioned major achievements of Indian science in 2018, including:

- production of aviation grade biofuel;
- Divya Nayan - a machine for visually impaired;
- inexpensive devices for diagnosis of cervical cancer, TB and dengue
- a real-time landslide warning system in the Sikkim-Darjeeling region.

He said that strong pathways to commercialization, are needed to leverage our Research & Development achievements, through industrial products. The Prime Minister called for research, which is a fusion of Arts and Humanities, Social Science, Science and Technology.

Noting that our strengths in research and development are built on the backbone of our national laboratories, central universities, IITs, IISC, TIFR and IISERs, the Prime Minister said that a strong research ecosystem must be developed in the State Universities and Colleges, as well.

He announced that the Union Government has approved a National Mission on Interdisciplinary Cyber Physical Systems with an investment of over Rs. 3600 crore. The Mission will cover in a seamless way, R&D, Technology Development, Human resources and Skills, Innovation, Start-up Ecosystem and strong Industry and International Collaborations, he added.

Speaking on achievements in the space sector, the Prime Minister mentioned the success of Cartosat 2 and other satellites. He said preparations are underway for sending three Indians into space, through the Gaganyaan in 2022. He expressed happiness that research has begun to find an effective solution for sickle cell anaemia.

He said that the 'Prime Minister's Science, Technology and Innovation Advisory Council' will help formulate appropriate Science and Technology interventions, catalyze collaborations across stakeholder Ministries and implement multi-stakeholder policy initiatives.

We have launched the 'Prime Minister's Research Fellows' Scheme under which, a thousand bright minds from the best Institutions in the country will be offered direct admission in Ph.D. Programs in IITs and IISc, the Prime Minister said. The scheme will catalyze quality research and address shortage of faculty in the premier Educational Institutions, he added.

President of India Inaugurates Centre of Excellence for Genetic Blood Disorders at Prathima Institute in Karimnagar

22-December-2018

The President of India, Shri Ram Nath Kovind, inaugurated the Centre of Excellence for Sickle Cell Anaemia, Thalassemia and Other Genetic Blood Disorders at the Prathima Institute of Medical Sciences in Karimnagar, Telangana today (December 22, 2018).

Speaking on the occasion, the President said that our country has made significant strides in the field of healthcare. However, we still have a long way to go in evolving a holistic healthcare system, one which is uniformly affordable and accessible. Strengthening public hospitals, municipal hospitals, charitable hospitals and primary health and wellness clinics must receive priority. This apart, we need to spread awareness on healthcare issues especially in rural areas and among disadvantaged sections.

Inter-Ministerial Cooperation for Promotion and Facilitation of Innovative Research on Phytopharmaceuticals amongst CSIR, DBT AND ICMR

December 31, 2018

India is known for its traditional systems of medicine for health care. The resource base to support delivery through such a system has been developed systematically over the years and is continuously being strengthened and positioned to attract the global attention. For the centuries,India has also been at theforefront forthe use of medicinal and aromatic plants.

The Gazette of India notification of guidelines for phytopharmaceutical drug development offers opportunity to leverage traditional knowledge for drug development based on modern science and modern medicine principles.

In order to leverage the effort, the Council of Scientific & Industrial Research (CSIR), Department of Biotechnology (DBT) and Indian Council of Medical Research (ICMR) have entered into Memorandum of Understanding (MoU) for inter-ministerial cooperation. The focus is on boosting innovative research on phytopharmaceuticals.

About the MoU

The MoU amongst CSIR, DBT and ICMR is for mutual collaboration to develop phytopharmaceutical products for therapeutic use following international standards and norms for establishing safety, quality, standardization and efficacy. The effort would beto take forward the leads already existing with CSIR, DBT and ICMR and develop specific collaborative projects in the domain aiming at rigorous modern scientific testing and development of standard products to maintain global competitiveness.

The role of each agency has been defined in the MoU. CSIR will be responsible for undertaking the R&D for developing desired phytopharmaceutical leads (both with short term & long term translational period), which can be taken forward for positioned product development following DCGI regulatory guidelines; pre-clinical pharmacology; CMC and IND enabling studies; and safety and regulatory toxicity studies. DBT would be responsible for identifying the leads based on its extra-mural research, providing funds for R&D projects taken under the MoU and preparation of respective sections of IND dossier in mutual collaboration with ICMR. Preparation of IND dossier and its submission to DCGI, preparation of clinical trials protocols, obtaining regulatory clearance for clinical trials and conducting trials with compilation

Photo: Secretary, DSIR & DG, CSIR and Secretary, DHR; Secretary, DBT; & DG, ICMR during the signing ceremony of the MoU

of results etc. would be the responsibility of ICMR.

This synergetic approach being put in the country for the first time would lead to taking up of the identified activities in the mission mode through best of the institutions in the Country. The CSIR had launched "Phytopharmaceutical Mission" about a year back

Cabinet approves bill for setting up of National Commission for Indian System of Medicine

The Union Cabinet on Friday approved the draft National Commission for Indian Systems of Medicine (NCIM) Bill, 2018, which seeks to replace the existing regulator, the Central Council for Indian Medicine (CCIM), with a new body to ensure transparency and accountability, an official statement said.

The draft bill provides for the constitution of a National Commission with four autonomous boards entrusted with conducting overall education of Ayurveda under the Board of Ayurveda and Unani, Siddha and Sowarigpa under the Board of Unani, Siddha and Sowarigpa.

Union Minister Ravi Shankar Prasad said, "It also proposes a common entrance exam and an exit exam, which all graduates will have to clear to get practising licenses. Further, a teacher's eligibility test has been proposed in the Bill to assess the standard of teachers before appointment and promotions."Till now things were adhoc, he added.

Prasad said the government was committed to promote Indian System of Medicine, from Ayurveda to Siddha to Unani.

Inter-Ministerial Cooperation for Promotion and Facilitation of Agricultural Biotechnology Research and Education, between ICAR and DBT

he Department of Biotechnology (DBT) has undertaken several activities and programs to promote Biotechnology Research & Development in the areas of Agriculture

Biotechnology. The Indian Council of Agricultural Research (ICAR) has been coordinating, guiding and managing research and education in Agriculture including horticulture, fisheries and animal sciences in the entire country. In order to leverage the efforts, the DBT and ICAR has entered into Memorandum of Understanding (MoU) for much-needed emphasis on multi-disciplinary R&D activities and nurturing innovations in Agricultural Biotechnology Research and Education.

About the MoU

The MoU between ICAR and DBT is for mutual collaboration to explore the possibility of cooperation, convergence and synergy to promote and accelerate the progress of research and training in various disciplines of agricultural biotechnology between ICAR and DBT.

The MoU will be implemented with the aim to collaborate with one another in mutually agreed-upon research programmes in the areas of agricultural biotechnology, funding of projects, policy issues, regulatory aspects, and other specified areas of National interest. The specific objectives are to plan and implement jointly the mutually agreed major National programmes through joint funding and sharing of resources in the priorities areas of agricultural biotechnology; to form common think tank of experts from ICAR and DBT and others to formulate policies; to establish National platform/centres for services related to genomics, genotyping, data banking, agriculture bioinformatics, GM food detection, validation of technologies such as vaccines, diagnostics of veterinary/ fisheries use, molecular markers in crop and animal breeding; to formulate and introduce courses/training programmes in the area of IPR, biosafety, biodiversity conservation and germ plasm exchange, genomic selection and breeding for faculty and students through appropriate mechanisms and; research prioritization with other ministries and foreign collation like Indo-UK SIC, BRICS, African countries and 'Look East' programme in relation to agricultural biotechnology.

Secretary, DBT highlighted the importance of the MOU through which five to ten focused programmes both short term, medium and long term will be developed and implemented. The major facilities and technology platforms created by both the agencies will be accessible to the National systems. A joint working group to be constituted to take the partnership forward. The collaborations also encompass to promote agri-innovations and start-ups, through the well established BIRAC mechanism. This flagship synergistic approach would be taken-up in mission mode through networking with the elite institutions in the Country.

Eli Lilly to acquire Loxo Oncology for $8 billion

Pharmaceutical giant Eli Lilly announced Monday it will acquire Loxo Oncology for around $8 billion, the latest big transaction aimed at developing and monetizing new treatments for cancer.

The deal supplements Eli Lilly's pipeline of cancer-oriented medicines with assets from Loxo, which was incorporated in 2013 and has a number of promising treatments at various stages of development.

Under the terms of Monday's deal—which follows last week's $74 billion announced takeover of Celgene by Bristol-Myers Squibb—Eli Lilly will pay $235 per share in cash, or about $8 billion, for Stanford, Connecticut-based Loxo.

The deal, which represents a premium of some 68 percent over Loxo Oncology's closing share price on Friday, is expected to close by the end of the first quarter, the companies said in a statement.

Loxo's product pipeline is centered on treating patients when there is an inappropriate DNA change that can be discovered through genomic testing. The company aims to develop targeted therapies that can impede the progression of these diseases.

A key driver for the deal because of near-term commercial potential is a treatment for lung, thyroid and some other tumors, Eli Lilly executives said on a conference call.

Eli Lilly executives said the compa-

ny could still do additional acquisitions in the coming period.

"We'll continue to look in oncology, as well as other therapeutic areas," Eli Lilly Chief Executive David Ricks said on a conference call with analysts.

Bayer Gets Rare Monsanto Reprieve With Cotton Seed Ruling

Bayer AG's Monsanto won a legal battle to own patents on genetically-modified cotton seeds in India, the world's biggest producer of the fiber, in a rare piece of good news for the German company.

India's Supreme Court ruled on Tuesday that Monsanto's patent for Bt cotton seeds is valid, overturning a judgment by the High Court of Delhi that said certain items such as seeds, plants and animals can't be patented. A two-judge bench, headed by Justice Rohinton F. Nariman, referred the matter to the lower court saying that all aspects related to Monsanto's patents on genetically-modified seeds can be considered by the Delhi court.

The ruling is a boost for Monsanto, which faced the risk of losing revenues without a claim over exclusive rights in India, as the company faces legal challenges in the U.S. over allegations that its Roundup weed killer can cause cancer as well as a backlash in Europe over genetically modified organisms. The verdict may also boost foreign investors' confidence about the validity of patents awarded to firms in India.

The ruling may prompt some biotech companies to revive expansion plans that were placed on hold amid restrictions imposed by the government and local courts in recent years.

Shares of Kaveri Seed Co. erased gains to drop as much as 3.6 percent on Tuesday, while Monsanto India Ltd. jumped as much as 13.5 percent in high volumes after the verdict.

The ruling is the result of years of legal battles between Monsanto and domestic seed companies, led by Nuziveedu Seeds Ltd. The Indian firm, one of the licensees of the U.S. company's seeds in India, had petitioned in the court to cancel Monsanto's patent. Monsanto had lodged counter cases for patent infringements by Indian companies.

BMS CEO Giovanni Caforio Lays out Reasoning for $74 Billion Acquisition of Celgene

When Bristol-Myers Squibb announced that it was snapping up Celgene Corporation for $74 billion, the news sent shockwaves throughout the biopharma industry. There are numerous questions that have yet to be answered, and won't be for some time, such as what will the new company look like and how many people could stand to lose their jobs due to the merger?

Over the past decade, BMS has been no stranger to flexing its M&A muscle. The company made numerous focused-acquisitions that have positioned itself as a leader in oncology. When announcing the acquisition, BMS CEO Giovanni Caforio noted that the massive deal for Celgene is another piece to that puzzle. Caforio said the combined might of the two pipelines will create "the number one oncology franchise" for both solid and hematologic tumors. The pillars of the combined pipeline will be built on the blockbuster checkpoint inhibitor Opdivo, as well as Yervoy and Celgene's powerhouse drugs, Revlimid and Pomalyst. And, Caforio also pointed to a cardiovascular pipeline led by Eliquis and a pipeline of inflammation drugs helmed by Orencia and Otezla. As Carafio spoke, he described a bright future for the combined companies.

"Looking to the future, we are encouraged by the opportunities we have moving forward, including more than 20 near-term registrational readouts. We are also excited by the potential to move I/O (immuno-oncology) into early dis-

ease settings, develop PD-1 combinations with existing standards of care and address emerging I/O refractory second line," Caforio said, according to a transcript of the conference call after the deal was announced. "All together, given the strength of our business and the opportunities that we see, I believe that we will continue to have a strong and leading I/O business into the future. Importantly, we will ensure that our commercial and R&D teams remain focused on delivering the value of this business."

When Caforio spoke with investors and reporters Thursday, he pointed to certain indications where he sees future growth, particularly in the area of treatments for multiple myeloma. With the foundation set by Celgene's Revlimid and Pomalyst, Carafio said they see the market evolving to one that includes new targets and modalities, such as BCMA, CELMoD and CAR-T. Carafio pointed to four near-term assets that have the potential to launch in the hematology market over the next one to two years. He said the combination of established and developmental products has strengthened the belief that the company will be "best positioned for long-term leadership in hematology."

In addition to the potential launch of four hematology products over the next two years, the company is also expecting two launches in immunology and inflammation, with TYK2 and ozanimod.

"We believe these assets have the potential to generate greater than $15 billion in peak sales, while adding scale and breadth to our immunology and oncology franchises, as well as being the first step to the next stage in hematology leadership," he said.

During the conference call, BMS did point to where it believes some $2.5 billion in savings can be found through cuts to R&D, manufacturing and other areas. Certainly, some cuts are expected in order to reduce redundancies, but how many jobs that will impact remains to be seen and likely won't be fully realized for many months.

When those cuts are made, BMS Chief Financial Officer Charles Bancroft said the company will follow "guiding principles to ensure we retain talent, protect key value drivers and leverage the enhanced scale of the new company."

China gives long-awaited GM crop approvals amid U.S. trade talks

China approved five genetically modified (GM) crops for import on Tuesday, the first in about 18 months in a move that could boost its overseas grains purchases and ease pressure from the United States to open its markets to more farm goods.

The United States is the world's biggest producer of GM crops, while China is the top importer of GM soybeans and canola.

U.S. farmers and global seed companies have long complained about Beijing's slow and unpredictable process for approving GM crops for import, stoking trade tensions between the world's two largest economies.

The approvals, announced on the agriculture ministry's website, were granted while a U.S. trade delegation is meeting with its counterparts in the Chinese capital this week. "It's a goodwill gesture toward the resolution of the trade issue," said a China representative of a U.S. agricultural industry association.

"It's been in the system for a long time but they chose today to release this good news," he added, declining to be identified due to the sensitivity of the matter. The approved products included DowDuPont Inc's (DWDP.N) DP4114 Qrome corn and DAS-44406-6 soybean, known as Enlist E3, as well as the SYHT0H2 soybean developed by Bayer CropScience and Syngenta (SYENF.PK) but now held by German chemical company BASF.

The other two newly approved products - BASF's RF3 canola and Bayer-owned (BAYGn.DE) Monsanto's glyphosate-tolerant MON 88302 canola - had been waiting six years for permission.

The approvals came as farmers in North America were deciding which seeds to plant this spring. China before the trade war bought

some 60 percent of U.S. soybeans and U.S. farmers do not widely plant varieties it has not approved.

The newly approved canola will allow farmers in Canada to boost production, according to Jim Everson, president of industry group the Canola Council. "The industry expects growers will produce $400 million more canola every year using the same amount of land - a step-change for canola productivity," Everson said in a statement.

Five other products known to be seeking approvals were not given the green light, including two GM alfalfa products developed by Monsanto and two DowDuPont soybean traits. Corteva Agriscience, the agriculture unit of DowDuPont, said, "We are happy to see the regulatory approval of our seed traits progressing in China."

Bayer said in a statement it welcomed the news but noted "many of these products were stuck in China's regulatory process for many years and others were not granted approvals, underscoring the need for continued improvement in China's regulatory processes."

Chinese officials met their U.S. counterparts in Beijing on Monday for the first face-to-face talks since U.S. President Donald Trump and Chinese President Xi Jinping agreed in December to a 90-day truce in a trade war that has roiled global markets.

China had not approved any GM crops for import since July 2017, when it cleared two products following high-level talks with Washington. It also approved two products in June 2017.

China's scientific advisory board on GM crops met in June but did not give the go-ahead for imports of any products.

"China's approval of the new GMO products is paving the way for China to import large volumes of U.S. soybeans in the future. It is a positive signal," said Li Qiang, chief analyst with Shanghai JC Intelligence Co Ltd.

Takeda-Shire Merger Is a Done Deal, Making Takeda the Largest Mass. Biotech Employer and R&D-Driven Biopharmaceutical Leader

Last year's sole mega-deal, the acquisition of Dublin-based Shire by Japan-based Takeda Pharmaceutical is finally closed. Takeda, 237 years old, is now a top 10 international drug company.

The entire deal began in March 2018, with Takeda expressing an interest in buying Shire. Once it was announced, per UK law, Takeda had a month to make an official offer. On April 19, Takeda made an official bid of about $66.22 (U.S.) per share, which had a value of about $60 billion (U.S.). Shire rejected the bid, arguing that it undervalued the company.

During that period, in an unrelated deal, Shire sold its oncology business to France's Servier for $2.4 billion. Oncology was a small part of Shire's portfolio, bringing in about $262 million in 2017.

Overall, Takeda made five public bids for Shire. Under the final bid, Shire agreed to be acquired for about $62.2 billion (U.S.), or $66.22 per share, made up of $30.33 per share in cash and 0.839 shares of Takeda stock. It also included Shire's debt, bringing the acquisition closer to $80 billion.

This acquisition now makes Takeda the largest biotech employer in Massachusetts, after Takeda indicated in September that it would transfer its U.S. headquarters to the state that also has over 3,000 Shire employees.

A relatively small but vocal group of Takeda shareholders attempted to scuttle the deal, but their initiatives failed to gain any traction. A Takeda family member became the voice of that group, Kazu Takeda. The group was dubbed Thinking About Takeda's Bright Future (TTBF). Although part of their opposition was broached as un-

dermining "Takeda-ism," which is that the company makes money by making people happy, concern that the size of the deal, particularly the debt Takeda was taking on, wasn't worth the advantages of scaling up.

But the deal has gone through and if 2019 so far is any indication, big deals are going to be a trend. In the first week, there's been a $74 billion deal of Bristol-Myers Squibb buying Celgene, and a smaller add-on deal of Eli Lilly acquiring Loxo Oncology for $8 billion. That may or may not indicate a trend. The beginning of 2018 also marked several notable add-ons, with Sanofi picking up Bioverativ in January for $11.6 billion only to follow it up a week later by buying Belgium-based Ablynx for $4.8 billion.

The Takeda-Shire merged company will make it the Number 10 biopharmaceutical company by revenue, with Number 1 being Johnson & Johnson with $76.5 billion in annual revenue and the newly merged Bristol-Myers Squibb-Celgene as Number 9 with $33.8 billion. Takeda-Shire is projected to have a combined revenue of $33.6 billion.

One thing that is a bit unusual about Takeda-Shire is that it will be a big pharmaceutical company that focuses on rare diseases, which it picks up from Shire. It also gains a much larger presence in the U.S. drug market. Bloomberg notes, "Japan hasn't become a dependable source for growth, because of a shrinking population and regulatory pressure that has pushed down drug prices nearly every year. Although the U.S. also poses a drug-pricing risk, it's one most pharma giants are willing to take for the revenue stream."

But the Takeda-Shire deal is also expected to increase dealmaking this year. Takeda's chief executive officer Christophe Weber indicated it expects to possibly unload $10 billion in assets to deleverage the $30 billion in debt it is taking on in addition to Shire's debt. So later this year expect to see Takeda selling non-core businesses outside of Japan.

Since March 2018, Shire shares dropped 26 percent. By the time the deal finalized in May, Shire's market valuation was higher than Takeda's. Takeda shares climbed 7.5 percent yesterday, the biggest gain in almost three years. SMBC Nikko Securities upgraded the company, stating it was "heavily undervalued."

James Watson: Scientist loses titles after claims over race

Nobel Prize-winning American scientist James Watson has been stripped of his honorary titles after repeating comments about race and intelligence.

In a TV programme, the pioneer in DNA studies made a reference to a view that genes cause a difference on average between blacks and whites on IQ tests.

Cold Spring Harbor Laboratory said the 90-year-old scientist's remarks were "unsubstantiated and reckless".

Dr Watson had made similar claims in 2007 and subsequently apologised.

He shared the Nobel in 1962 with Maurice Wilkins and Francis Crick for their 1953 discovery of the DNA's double helix structure.

Dr Watson sold his gold medal in 2014, saying he had been ostracised by the scientific community after his remarks about race.

In 2007, the scientist, who once worked at the University of Cambridge's Cavendish Laboratory, told the Times newspaper that he was "inherently gloomy about the prospect of Africa" because "all our social policies are based on the fact that their intelligence is the same as ours - whereas all the testing says not really".

While his hope was that everybody was equal, he added, "people who have to deal with black employees find this is not true".

After those remarks, Dr Watson lost his job as chancellor at the laboratory and was removed from all his administrative duties. He wrote an apology and retained his honorary titles of chancellor emeritus, Oliver R Grace professor emeritus and honorary trustee.

But Cold Spring Harbor said it was now stripping him of those

titles after he said his views had not changed in the documentary American Masters: Decoding Watson, aired on US public broadcaster PBS earlier this month.

"Dr Watson's statements are reprehensible, unsupported by science," the laboratory said in a statement, adding that they effectively reverse his apology.

In an interview with the news agency, his son Rufus said Dr Watson's statements "might make him out to be a bigot and discriminatory" but that was not true.

"They just represent his rather narrow interpretation of genetic destiny... My dad had made the lab his life, and yet now the lab considers him a liability."

Samsung Bioepis Partners with 3SBio to Expand Biosimilar Business into China

Samsung Bioepis Co., Ltd. today announced that its rapidly growing biosimilar business will expand into mainland China through a licensing agreement with 3SBio Inc. The agreement covers multiple biosimilar candidates from Samsung Bioepis, including SB8, a biosimilar candidate referencing AVASTIN® 1 (bevacizumab).

Under the agreement, Samsung Bioepis and 3SBio will collaborate across a number of areas, including clinical development, regulatory registration and commercialization in China. Samsung Bioepis will receive upfront and milestone payments, as well as royalties on sales. Additional financial details were not disclosed.

"We are very excited to expand our biosimilar business into China, where we hope to see our biosimilars play an important role in widening patient access to high-quality healthcare. We are confident we will achieve this goal through our partnership with 3SBio, which brings together Samsung Bioepis' proven development platform with 3SBio's strong commercialization platform," said Christopher Hansung Ko, President and Chief Executive Officer, Samsung Bioepis. "At Samsung Bioepis, we will continue to demonstrate our enduring commitment to biosimilars by further strengthening our pipeline and widening their availability for patients and healthcare systems across the world."

Established in February 2012, Samsung Bioepis currently has four biosimilars approved and marketed across Europe, which include the anti-TNF trio of BENEPALI™ (etanercept), FLIXABI™ (infliximab) and IMRALDI™ (adalimumab), as well as an oncologic biosimilar, ONTRUZANT® (trastuzumab). In the United States, the company has one biosimilar approved and marketed, RENFLEXIS® (infliximab), with both SB5 (adalimumab) and SB3 (trastuzumab) biosimilar candidates currently under regulatory review.

In total, over 100,000 patients across the world are currently under treatment with Samsung Bioepis' biosimilars, with over 6 million doses administered.

About 3SBio Inc.
3SBio is a fully-integrated biotechnology company in China with market-leading biopharmaceutical franchises in oncology, auto-immune diseases, nephrology, metabolic diseases and dermatology. 3SBio is focused on building an innovative product pipeline, with over 30 products candidates under development. 3SBio's manufacturing capabilities include recombinant proteins, monoclonal antibodies and chemically- synthesized molecules, with production centers in Shenyang, Shanghai, Hangzhou, Shenzhen and Cuomo, Italy. Please visit www.3sbio.com for additional information.

About Samsung Bioepis Co., Ltd.
Established in 2012, Samsung Bioepis is a biopharmaceutical company committed to realizing healthcare that is accessible to everyone. Through innovations in product development and a firm commitment to quality, Samsung Bioepis aims to become the world's leading biopharmaceutical company. Samsung Bioepis continues to advance a broad pipeline of biosimilar candidates that cover a spectrum of therapeutic areas, including immunology, oncology, ophthalmology and hematology. Samsung Bioepis is a joint venture between Samsung BioLogics and Biogen.

Sandoz, Gan & Lee ink deal to develop insulin biosimilars

Sandoz, a Novartis division, has entered into an agreement with Gan & Lee to commercialize biosimilar versions of insulins used in patients with type 1 and type 2 diabetes.

The commercialization and supply agreement with Gan & Lee aims at bringing to market biosimilar versions of glargine, lispro and aspart — the three top insulin medicines by sales.

Gan & Lee is a leading insulin supplier headquartered in China with more than 20 years' experience in insulins and production capacity with attractive cost of goods sold structures.

Under the terms of the agreement, Sandoz will be fully responsible for commercializing these medicines in the EU, United States, Switzerland, Japan, South Korea, Canada, Australia and New Zealand.
Gan & Lee will be responsible for manufacturing and development, with support from Sandoz, and shall adhere to the stringent manufacturing requirements established for Sandoz biosimilars. Other specific terms of the agreement are confidential.

"Across the world, people suffering from diabetes still face very real access challenges. In fact, U.S. patients have reported taking less insulin than recommended by their doctor because they couldn't afford it — putting them at higher risk for serious complications," Sandoz CEO, Richard Francis, said."At Sandoz, we have significant experience disrupting and transforming marketplaces, and look forward to extending access for the more than 420 million people worldwide suffering from diabetes."

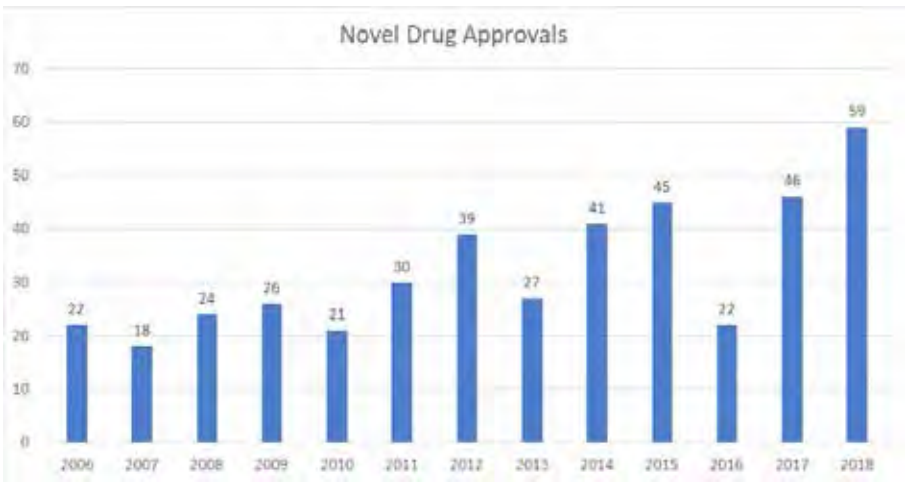
FDA Approves Record-Breaking 59 Novel Drugs in 2018

The past year proved to be a big one for the U.S. Food and Drug Administration (FDA) and the approval of novel drugs.

Over the course of 2018, the FDA approved 59 different novel drugs that range for the treatment of various cancers, chronic obstructive pulmonary disease (COPD), traveler's diarrhea, migraine headaches and more. Over the past 190 years, the FDA has averaged an approval of 33 novel drugs each year, with 2018 having the highest number. In 2017, the FDA approved 46 novel drugs, but only 22 in 2016.

Novel drugs are classified as new molecular entities. In its classification, the FDA said: "many of these products contain active moieties that have not been approved by FDA previously, either as a single ingredient drug or as part of a combination product."

In a report issued on its drug approvals for 2019, the FDA noted that many of the novel drugs approved over the past year were notable due to their "positive impact and unique contributions to quality medical care and patient treatment." Of the 59 novel drugs approved in 2018, 19 of them, 32 percent, were considered first-in-class. The FDA noted that this designation is a strong indicator of a drug's potential positive impact on healthcare. Novel drugs approved in 2018 that FDA identified as first-in-class include Aimovig, Galafold and Vitrakvi.



Source: FDA.gov

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RESEARCH NEWS

From other High Impact Journals

A new 'atlas' of genetic influences on osteoporosis

A ground-breaking new study led by researchers from the Lady Davis Institute (LDI) at the Jewish General Hospital (JGH) has succeeded in compiling an atlas of genetic factors associated with estimated bone mineral density (BMD), one of the most clinically relevant factors in diagnosing osteoporosis. The paper, published in Nature Genetics, identifies 518 genome-wide loci, of which 301 are newly discovered, that explain 20% of the genetic variance associated with osteoporosis. Having identified so many genetic factors offers great promise for the development of novel targeted therapeutics to treat the disease and reduce the risk of fracture.

"Our findings represent significant progress in highlighting drug development opportunities," explains Dr. Brent Richards, the lead investigator, a geneticist at the LDI's Centre for Clinical Epidemiology who treats patients with osteoporosis in his practice at the JGH. "This set of genetic changes that influence BMD provides drug targets that are likely to be helpful for osteoporotic fracture prevention."

Osteoporosis is a very common age-related condition characterized by the progressive reduction of bone strength, which results in a high risk of fracture. Especially among older patients, fractures can have severe consequences, including the risk of mortality. Among all sufferers, fractures impose major burdens of hospitalization and extended rehabilitation. As the population ages, the urgency of improving preventive measures becomes all the more intense.

"We currently have few treatment options," said Dr. Richards, a Professor of Medicine, Human Genetics, and Epidemiology and Biostatistics at McGill University, "and many patients who are at high risk of fractures do not take current medications because of fear of side effects. Notwithstanding that it is always better to prevent than to treat. We can prescribe injectables that build bone, but they are prohibitively expensive. We have medications that prevent loss of bone, but they must be taken on a strict schedule. As a result, the number of

people who should be treated, but are not, is high. Therefore, we believe that we will have greater success in getting patients to follow a treatment regimen when it can be simplified."

This was the largest study ever undertaken of the genetic determinants of osteoporosis, assessing more than 426,000 individuals in the UK Biobank. After analyzing the data, the researchers further refined their findings to isolate a set of genes that are very strongly enriched for known drug targets. This smaller set of target genes will allow drug developers to narrow their search for a solution to the clinical problem of preventing fractures in those people who are predisposed to osteoporotic fractures. Animal models have already proven the validity of some of these genes.

"Although we found many genetic factors associated with BMD, the kind of precision medicine that genetics offers should allow us to hone in on those factors that can have the greatest effect on improving bone density and lessening the risk of fracture," said Dr. John Morris, also from the LDI and McGill University, the lead author on the study.

Journal Reference:
An atlas of genetic influences on osteoporosis in humans and mice. Nature Genetics, 2018; DOI: 10.1038/s41588-018-0302-x

New 'Bionic face' treatment approach for facial paralysis

Initial experiments in animals show promising results with a "bionic face" approach to facial reanimation -- using electrical signals from the uninjured side of the face to trigger muscle movement on the paralyzed side. "Such an approach... would represent a paradigm shift in management" of hemifacial palsy, according to research led by Nate Jowett, MD, of Massachusetts Eye and Ear Infirmary and Harvard Medical School.

Hemifacial palsy is a "devastating clinical condition" leading to functional, aesthetic, and communication problems. While reconstructive surgery approaches such as nerve and muscle transfers can restore some facial movement, these techniques have important shortcomings. For example, while patients may regain some ability to smile, it requires a conscious effort to do so.

Dr. Jowett and coauthors report the development and "proof of principle" of a new technique using functional electrical stimulation to restore motion of the face in hemifacial palsy. To evoke more natural and appropriate movements, the stimulation of the paralyzed side is linked to the electrical activity on the unaffected side to produce paired muscle contractions.

The researchers implanted tiny electrically-shielded cuff electrodes around the facial nerve of rats with experimentally induced hemifacial palsy. Electrical stimulation was delivered to produce eye blinks and whisker movements of varying durations and amplitudes. Movements were evoked by linking stimulation of the para-

lyzed side driven to movements on the uninjured side. The "paired muscle contractions" produce more natural, normal-appearing movements. The authors note that most facial expressions, especially positive ones, are symmetrical.

But for functional electrical stimulation to work, the researchers had to overcome another challenge: suppressing undesired/involuntary facial movements caused by impulses from regrown nerves or surgically transferred nerves. This was done by concurrently applying high-frequency alternating current to block the nerve signals causing undesired movements. This technique provided "effective and reversible facial nerve blockade," with no apparent harmful effects.

Previous studies have reported the basic concept of using signals from the healthy side of the face to drive functional electrical stimulation of paralyzed facial muscles. But the new study addresses some key technical challenges affect the long-term success of this approach -- including providing more natural, spontaneous smile and other facial movements while blocking unwanted, involuntary movements.

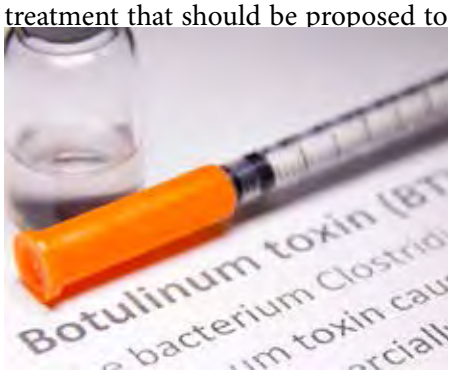
While the preliminary experiments in rats are encouraging, there's a long way to go before the "bionic face" can be refined enough for testing in human patients with hemifacial palsy. The authors plan further studies to develop a miniaturized, fully implantable neuroprosthetic device for hemifacial reanimation.

"Though the ultimate goal of reanimation is to restore dynamic motion of the entire facial musculature, restoration of three symmetric facial movements alone -- brow elevation, blink, and smile -- would dramatically improve outcomes," Dr. Jowett and coauthors write. They believe that the combination of proximal neural blockade with distal functional electrical stimulation might also prove useful in treatment of other peripheral nerve disorders, such as spastic disorders (abnormal muscle contractions) or neuropathic conditions (nerve pain).

Journal Reference:
Plastic and Reconstructive Surgery, 2019; 143 (1): 62e DOI: 10.1097/PRS.0000000000005164

Botulinum toxin reduces chronic migraine attacks, compared to placebo

Based on meta-analysis of pooled clinical trial data, botulinum toxin is superior to inactive placebo for preventive treatment of migraine, report Prof. Benoit Chaput, MD, PhD, of University Hospital Rangueil, Toulouse, France, and colleagues. "Botulinum toxin is a safe and well-tolerated treatment that should be proposed to patients with migraine," the researchers write.



Assembled Evidence Supports Effectiveness of Botox for Chronic Migraine

Prof. Chaput and colleagues identified and analyzed data from 17 previous randomized trials comparing botulinum toxin with placebo for preventive treatment of migraine headaches. Botulinum toxin -- best known by the brand name Botox -- was approved by the US Food and Drug Administration (FDA) for treatment of chronic migraine in 2010. Since then, a growing number of patients have reported successful results with botulinum toxin injections to alleviate chronic migraine headaches.

The 17 studies included nearly 3,650 patients, about 1,550 of whom had chronic migraine: defined as at least 15 headache attacks per month for more than three months, with migraine symptoms on at least eight days per month. The remaining patients had less-frequent episodic migraine headaches.

On pooled data analysis, botulinum toxin injections significantly reduced the frequency of chronic migraine attacks with. Three months after injection, patients treated with botulinum toxin had an average of 1.6 fewer migraine attacks per month, compared to those treated with inactive placebo.

The improvement was apparent within two months of botulinum toxin treatment. To sustain the effects of treatment, botulinum toxin injections are typically repeated every three months.

There was also a "statistical tendency" toward less-frequent attacks with botulinum toxin in patients with episodic migraine. Again, improvement occurred within two months. Although botulinum toxin had a higher rate of adverse effects compared to placebo, none of these were serious.

The pooled data also showed significant improvement in quality of life

in patients treated with botulinum toxin. This improvement was directly linked to a reduction in depressive symptoms. "It can be explained by the reduced impact of headaches and migraine-related disability, thus reducing symptoms of depression and anxiety," Prof. Chaput and coauthors write.

Migraine headaches are an increasingly common condition, leading to significant disability and increased use of healthcare resources. Although botulinum toxin injection for chronic migraine is FDA-approved, there are still conflicting data regarding its effectiveness. The new report provides a comprehensive analysis of the highest-quality evidence to date, including three randomized trials not included in previous reports.

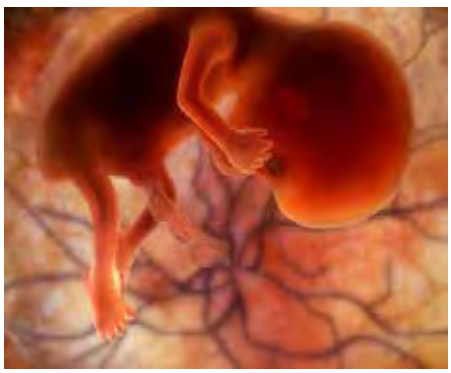
The results strongly support the effectiveness of botulinum toxin injection as preventive treatment for chronic migraine, with significant reductions in headache frequency at both two and three months. Prof. Chaput and colleagues add, "For the first time, our analysis highlights the significant improvement in patients' quality of life at three months in the Botox group -- which exhibited few and mild adverse events."

Journal Reference:
Botulinum Toxin versus Placebo. Plastic and Reconstructive Surgery, 2019; 143 (1): 239 DOI: 10.1097/PRS.0000000000005111

New discovery to understand-how genes shape early embryos

Until now, it was unclear how this DNA packing affected development in early embryos. In a paper published this week in Science, researchers from the Perelman School of Medicine at the University of Pennsylvania found that in mouse embryos -- only eight days after fertilization -- compacted regions along the genome increase at protein-coding genes. Days later in the cell differentiation phase, these domains open to allow certain genes to be read and made into their corresponding proteins.

"This is a fundamental change in our understanding of how genes are controlled in the early embryo, even if we can't yet see all the potential clinical



impacts," said Ken Zaret, PhD, director of the Penn Institute of Regenerative Medicine and a professor of Cell and Developmental Biology. "This study demonstrates the importance of the 'off position' for gene activity in early animal development."

First author Dario Nicetto, PhD, a postdoctoral fellow in Zaret's lab, explains that he and coauthors think that during the earliest stages of development, more compacted gene-coding regions arise so that a cell can make rapid "decisions" about which genes should be made into proteins. However, if genes are not open at the correct regions to be read and made into appropriate proteins, cells lose their proper identity and give rise to damaged tissue, and eventually death.

The team also found that compacted regions were marked by three methyl molecules, which occur at specific sites of protein binding along the genome. Basically, more trimethylation leads to more compaction, which means less of the genome is available to mRNA to eventually make full-length proteins. On the other hand, less trimethylation means less compaction, so more of the genome is available for transcribing into working proteins.

The team showed that if they deactivated the enzymes that add the methyl groups onto chromosomes, it causes out-of-place expression of cell-inappropriate genes leading to the eventual death of tissue. For example, they found that genes that are not normally "on" in liver cells are activated, which led to cell death and ultimately inadequate liver function.

Future studies will look at how the three enzymes "learn" which parts of the genome to silence.

Reference
University of Pennsylvania School of Medicine

Human blood cells can be directly reprogrammed into neural stem cells

Stem cells are considered to be the all-rounders of our tissues: they can multiply indefinitely and then -- if they are pluripotent embryonic stem cells -- generate all conceivable cell types. In 2006, the Japanese scientist

Shinya Yamanaka recognized that such cells could also be produced in the laboratory -- from mature body cells. Four genetic factors alone are sufficient to reverse the course of development and produce so-called induced pluripotent stem cells (iPS) that have identical properties to embryonic stem cells. Yamanaka was awarded the Nobel Prize for Medicine in 2012 for this discovery.

"This was a major breakthrough for stem cell research," said Andreas Trumpp, German Cancer Research Center (DKFZ) and Director of HI-STEM in Heidelberg. "This applies in particular to for research in Germany, where the generation of human embryonic stem cells is not permitted. Stem cells have enormous potential both for basic research and for the development of regenerative therapies that aim to restore diseased tissue in patients. However, reprogramming is also associated with problems: For example, pluripotent cells can form germ line tumors, so-called teratomas.

Another possibility is not to completely turn back the course of development. For the first time, Trumpp's team has succeeded in reprogramming mature human cells in such a way that a defined type of induced neural stem cells is produced that can multiply almost indefinitely. "We used four genetic factors like Yamanaka, but different ones for our reprogramming," explains Marc Christian Thier, first author of the study. "We assumed that our factors would allow reprogramming to an early stage of development of the nervous system."

In the past, other research groups also reprogrammed connective tissue cells into mature nerve cells or neural precursor cells. However, these artificially produced nerve cells often could not be expanded and could therefore hardly be used for therapeutic purposes. "Often, it was a heterogeneous mixture of different cell types that might not exist in the body under physiological conditions," said Andreas Trumpp explaining the problems.

Together with stem cell researcher Frank Edenhofer from the University of Innsbruck and neuroscientist Hannah Monyer from DKFZ and the Heidelberg University Hospital, Trumpp and his team have succeeded in reprogramming different human cells: connective tissue cells of the skin or pancreas as well as peripheral blood cells. "The origin of the cells had no influence on the properties of the stem cells," said Thier. In particular, the possibility of extracting neural stem cells from the blood of patients without invasive intervention is a decisive advantage for future therapeutic approaches.

What is special about the reprogrammed cells of the Heidelberg researchers is that they are a homogeneous cell type that resembles a stage of neural stem cells that occurs during the embryonic development of the nervous system. "Corresponding cells exist in mice and probably also in humans during early embryonic brain development," said Thier. "We have described here a new neural stem cell type in the mammalian embryo.

These so called "induced Neural Plate Border Stem Cells" (iNBSCs) have a broad development potential. The iNBSCs of the Heidelberg scientists are expandable and multipotent and can develop in two different directions. On the one hand, they can take the path of development to mature nerve cells and their supplier cells, the glial cells, i.e. become cells of the central nervous system. On the other hand, they can also develop into cells of the neural crest, from which different cell types emerge, for example peripheral sensitive nerve cells or cartilage and bones of the skull.

The iNBSCs thus form an ideal basis for generating a broad range of different cell types for an individual patient. "These cells have the same genetic material as the donor and are therefore presumably recognized as "self" by the immune system and are not rejected," explains Thier.

The CRISPR/Cas9 gene scissors can be used to modify the iNBSC or repair genetic defects, as the scientists have shown in their experiments. "They are therefore of interesting both for basic research and the search for new active substances and for the development of regenerative therapies, for example in patients with diseases of the nervous system. However until we can use them in patients, a lot of research work will still be necessary," emphasizes Trumpp.

Journal Reference:
Identification of Embryonic Neural Plate Border Stem Cells and Their Generation by Direct Reprogramming from Adult Human Blood Cells. Cell Stem Cell, 2018; DOI: 10.1016/j.stem.2018.11.015

Researchers correct genetic mutation that causes IPEX, a life-threatening autoimmune syndrome

IPEX is caused by a mutation that

prevents a gene called FoxP3 from making a protein needed for blood stem cells to produce immune cells called regulatory T cells. Regulatory T cells keep the body's immune system in check; without them, the immune system attacks the body's own tissues and organs, which is known as autoimmunity.

The approach adds a normal copy of the FoxP3 gene to blood stem cells, which can produce all types of blood cells. In the study, the approach corrected the genetic mutation in mice with a version of IPEX that's similar to the human version of the disease, and it restored proper immune regulation.

To get the normal copy of the FoxP3 gene to the proper place within the blood stem cells, the researchers used a tool called a viral vector -- a specially modified virus that can carry genetic information to a cell's nucleus without causing a viral infection. The UCLA team engineered the viral vector used in the study so that the gene is turned on only in regulatory T cells, but not in other types of cells.

"It's exciting to see how our gene therapy techniques can be used for multiple immune conditions," said Kohn, a professor of pediatrics and microbiology, immunology and molecular genetics at the David Geffen School of Medicine at UCLA and member of the Eli and Edythe Broad Center of Regenerative Medicine and Stem Cell Research at UCLA. "This is the first time we've tested a technique that targets an autoimmune disorder, and the findings could help us better understand or lead to novel treatments for other autoimmune conditions such as multiple sclerosis or lupus."

The name IPEX stands for immune dysregulation, polyendocrinopathy, enteropathy, X-linked. The syndrome can affect the intestines, skin and hormone-producing glands such as the pancreas and thyroid, as well as other parts of the body. It is typically diagnosed within the first year of life and can be life-threatening in early childhood. IPEX can be treated with a bone marrow transplant, but finding a matched bone marrow donor can be difficult, and the transplant procedure is often risky because people with IPEX can be very sick.

In the new study, the UCLA researchers used viral vectors to deliver normal copies of the FoxP3 gene to the genome of the mice's blood stem cells so that they produced functional regulatory T cells. All of the mice in the study were virtually free of IPEX symptoms shortly after the treatment.

"It's incredibly important that we only create regulatory T cells that have the non-mutated FoxP3 gene," said Katelyn Masiuk, a student in the ULCA physician-scientist degree program and the study's first author. "We found that if the FoxP3 protein is turned on in blood stem cells, the whole blood system functions abnormally. We realized that we needed a vector that only made FoxP3 in the regulatory T cells made from the blood stem cells, but not in the blood stem cells themselves or other types of blood cells they make."

The researchers also put their IPEX-targeting vector into human blood stem cells and then transfused those cells into mice without immune systems. The human blood stem cells were able to produce regulatory T cells that turned on the vector.

Kohn, who also is a member of the UCLA Children's Discovery and Innovation Institute and the UCLA Jonsson Comprehensive Cancer Center, said the results are promising and the researchers hope to test the approach in human patients.

Kohn said that to treat humans with IPEX, blood stem cells would be removed from the bone marrow of patients with IPEX. Then, the FoxP3 mutation would be corrected in a lab using the IPEX-targeting vector. The patients would receive a transplant of their own corrected blood stem cells, which would produce a continuous life-long supply of regulatory T cells.

Kohn is also the principal investigator in a clinical trial that is testing the use of patients' own genetically corrected blood stem cells to treat sickle cell disease, the most common inherited blood disorder in the U.S. And in another study led by Kohn, a similar technique has cured 40 babies with SCID.

Kohn, Masiuk, Dr. Roger Hollis (a study co-author and member of Kohn's lab) and Dr. Maria Grazia Roncarolo of Stanford University are inventors of the FoxP3 vector, for which a patent application has been filed by the UCLA Technology Development Group on behalf of the Regents of the University of California. The FoxP3 vector for IPEX is not yet available in clinical trials and has not been approved by the FDA for use in humans.

The research was funded by the UCLA Molecular Biology Institute's Whitcome Predoctoral Training Program and the T32 Medical Scientist Training Program, a program of the National Institute of General Medical Sciences.

Journal Reference:
Lentiviral Gene Therapy in HSCs Restores Lineage-Specific Foxp3 Expression and Suppresses Autoimmunity in a Mouse Model of IPEX Syndrome. Cell Stem Cell, 2019; DOI: 10.1016/j.stem.2018.12.003 Researchers use 'blacklist' computing concept as novel way to streamline genetic analysis

Researchers discovered a new use for computational concept 'blacklisting'

Using blacklisting as a filter to single out genetic variations in patient genomes and exomes that do not cause illness, researchers have successfully streamlined the identification of genetic drivers of disease.

In whole-exome sequencing -- the process of identifying variations in protein-coding genes to determine the genetic underpinnings of any given illness -- tens of thousands of genetic variants are identified, but only a few are deemed pathogenic, meaning disease-causing. Traditionally, in order to identify pathogenic mutations, scientists must sift through considerable amounts of data and remove genetic variants that are unlikely to cause disease, slowing down the process of genetic analysis and, subsequently, clinical treatment. To address this cumbersome process, researchers from the Icahn School of Medicine and The Rockefeller University investigated and subsequently identified a large portion of the non-pathogenic genetic variants, from which the "blacklist" was generated. Following this, they developed a program, known as ReFiNE, and a corresponding webserver that other researchers can use to automate the creation of their own blacklists.

"Until now, there has been no viable published method for filtering out non-pathogenic variants that are common in human genomes and absent from current genomic databases," said Yuval Itan, PhD, Assistant Professor of Genetics and Genomic Sciences at the Icahn School of Medicine and senior author of the publication. "Using the blacklist, researchers will now be able to remove genetic 'noise' and focus on true disease-causing mutations."
Noting the data-centric society we live in, Dr. Yuval says efficiency is key. His hope is that this contemporary tool can be used by clinicians, researchers, and scientists across the globe to conduct genetic analysis more quickly and accurately, helping to accelerate the pace of genomic medicine.

Journal Reference:
Blacklisting variants common in private cohorts but not in public databases optimizes human exome analysis. Proceedings of the National Academy of Sciences, 2018; 201808403 DOI: 10.1073/pnas.1808403116

Scientists synthesize molecule capable of eliminating hepatitis C virus

A new compound that inhibits the replication of hepatitis C virus (HCV) in several stages of its lifecycle -- and is also capable of acting on bacteria, fungi and cancer cells -- has been synthesized by researchers at São Paulo State University (UNESP) in Brazil.

"We discovered that the compound acts on HCV in almost all stages of its reproductive cycle, which is unusual for antivirals. They generally have specific isolated targets, such as capsid proteins, membrane receptors or specific proteins such as NS3, inhibiting specific processes such as viral cell entry, the synthesis of genetic material and proteins, or the assembly and release of new viral particles. GA-Hecate, in contrast, showed broad activity encompassing several stages of the cycle," Sanches explained.

"The compound also displayed ac-

tivity in lipid droplets, small lipid organelles in cells that are used by HCV during its replication and assembly and that protect the virus from attack by enzymes. GA-Hecate breaks these lipid droplets down and leaves the virus's replicative complex exposed to the action of cellular enzymes."

The researchers tested GA-Hecate both on the complete virus and on its "subgenome replicons," which contain all the elements required by the virus for replication of its genetic material in cells but are incapable of synthesizing the proteins responsible for infection. The compound was effective in all tests. Another positive property of the compound is that it is highly selective, meaning it attacks the virus rather than the host cells. As such, it has the potential to be used as a drug for the treatment of the disease.

"Although the compound didn't display significant action on erythrocytes -- red blood cells -- the molecule has to undergo changes in its structure to reduce its toxicity still further," Sanches said. "This is what we're working on now, so that our research can move on from the in vitro stage to the in vivo stage." According to Professor Eduardo Maffud Cilli, who supervised Sanches's PhD research at UNESP's Chemistry Institute in Araraquara, "the average time it takes to plan and develop therapeutic peptides is ten years. A study with this estimate has just come out. So far, approximately two years have been spent on developing the GA-Hecate molecule. Considering the statistical average, another eight years will be needed until the drug can come to market."

Journal Reference:
GA-Hecate antiviral properties on HCV whole cycle represent a new antiviral class and open the door for the development of broad spectrum antivirals. Scientific Reports, 2018; 8 (1) DOI: 10.1038/s41598-018-32176-w

Scientists discovered new light sensor in green algae

The decades-long search for these light sensors led to a first success in 2002: Georg Nagel, at the time at Max-Planck-Institute of Biophysics in Frankfurt/M, and collaborators discovered and characterized two so-called channelrhodopsins in algae. These ion channels absorb light, then open up and transport ions. They were named after the visual pigments of humans and animals, the rhodopsins.

Now a third "eye" in algae is known: Researchers discovered a new light sensor with unexpected properties. The research groups of Professor Armin Hallmann (Bielefeld University) and Professor Georg Nagel (Julius-Maximilians-Universität Würzburg, JMU) report this finding in the journal BMC Biology.

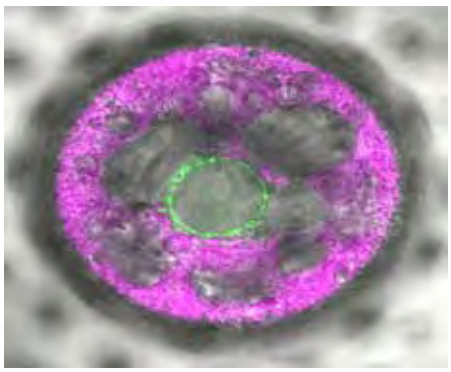


Photo: In this multicellular Volvox alga, the novel light sensor 2c-cyclop was labeled with fluorescence (green). It shows up in membranes around the nucleus. Credit: Eva Laura von der Heyde

Read more at: https://phys.org/news/2019-01-algae-eye.html#jCp
The surprise: The new photoreceptor is not activated by light but inhibited. It is a guanylyl cyclase which is an enzyme that synthesizes the important messenger cGMP. When exposed to light, cGMP production is severely reduced, leading to a reduced cGMP concentration -- and that's exactly what happens in the human eye as soon as the rhodopsins there absorb light.

The newly discovered sensor is regulated by light and by the molecule ATP. Such "two component systems" are already well known in bacteria, but not in higher evolved cells. The researchers have named the new photoreceptor "Two Component Cyclase Opsin," 2c-cyclop for short. They found it in two green algae, in the unicellular Chlamydomonas reinhardtii as well as in the multicellular Volvox carteri.

The authors believe that the 2c-Cyclop light sensor offers new opportunities for optogenetics. With this methodology, the activity of living tissues and organisms can be influenced by light signals. By means of optogenetics, many basic biological processes in cells have already been elucidated. For example, it provided new insights into the mechanisms of Parkinson's disease and other neurological diseases. She also brought new insights into diseases like autism, schizophrenia, and depression or anxiety disorders.

Journal Reference:
Two-component cyclase opsins of green algae are ATP-dependent and light-inhibited guanylyl cyclases. BMC Biology, 2018; 16 (1) DOI: 10.1186/s12915-018-0613-5

Alfredo Fusco, facing misconduct charges in Italy, up to 21 retractions

Source: Retraction Watch

Alfredo Fusco, a researcher in Italy who has faced criminal charges for research misconduct for more than five years, has had six more papers retracted, for a total of 21.

The latest six retractions are all from Cancer Research. An example, for "Haploinsufficiency of the Hmga1 Gene Causes Cardiac Hypertrophy and Myelo-Lymphoproliferative Disorders in Mice," a paper first published in 2006:

The papers have been cited from 26 to 76 times, according to Clarivate Analytics' Web of Science.

Researchers in Italy have been frustrated by the lack of progress in the investigation into Fusco's work, Nature reported last year.

Fusco did not respond to a request for comment from Retraction Watch.

One of the six retracted papers includes Carlo Croce as an author. It is the ninth retraction for Croce, who was recently forced to step down as chair of his department at The Ohio State University following years of allegations of misconduct.

With the new retraction total, Fusco is now tied for 29th place on our leaderboard of authors with the most retractions in the world.

An Australian university cleared a cancer researcher of misconduct. He's now retracted six papers

Source: Retraction Watch

A paper co-authored by Khachigian — whose work at the University of New South Wales (UNSW) has been funded by millions of dollars in funding from the Australian government, and has led to clinical trials, although more on that later — was retracted from Biochemical and Biophysical Research Communications. The "corresponding author published the paper without the full consent or acknowledgement of all the researchers and would like to apologize for this error," according to that notice.

Three more papers, all from the Journal of Biological Chemistry (JBC), were retracted the following July, saying only that "This article has been withdrawn by the authors," as was typical for the JBC for many years.

A bit less than three years later, David Vaux, of the Walter and Eliza Hall Institute (and now a member of the board of directors of our parent non-profit organization, The Center For Scientific Integrity), wrote to UNSW about a different paper by Khachigian, "c-Jun regulates shear- and injury-inducible Egr-1 expression, vein graft stenosis after autologous end-to-side transplantation in rabbits, and intimal hyperplasia in human saphenous veins." Six of the figures in that paper, Vaux wrote in an email dated February 14, 2013, appear to contain duplications and/or alterations of images in such a way that the same data is used to represent two different conditions.

A week after receiving Vaux's message in 2013, UNSW deputy vice-chancellor for research Les Field wrote to Khachigian, saying he would be conducting a preliminary investigation and asking for the original data behind the JBC article.

Meanwhile, on March 19, Khachigian registered a second planned trial of Dz13, a compound that scientists hoped could treat skin cancers, among other conditions. But on July 30, that trial was suspended, with the Australian Broadcasting Corporation reporting that Khachigian and his team had been cleared of misconduct in two previous investigations but were the subject of a third. In October, Khachigian was placed on leave.

Less than two months later, on New Year's Day 2014, Australia's NHMRC began funding an $8.3 million

(AUS), 5-year grant to study Dz13, led by Khachigian — who was, at the time, still on leave.

In July 2014, Martin told Khachigian that he had once again been cleared of misconduct. And in May 2015, Martin said in a memo to UNSW faculty and staff that Khachigian would be returning to the university on May 18.

In November 2015, UNSW issued a statement to that effect. Meanwhile, in early 2016, Circulation Research retracted another paper by Khachigian, also for figure issues. And last month, the JBC retracted the 2010 paper, making the sixth retraction for Khachigian, who did not respond to a request for comment from Retraction Watch for this story.

How to investigate allegations of research misconduct: A checklist

Do investigations into research misconduct allegations need better standards? The Association for the Promotion of Research Integrity (APRIN) in Japan, a group of volunteers who "commit themselves to the promotion of research of high integrity" and provide "e-learning material for research ethics education," thinks so. Today, we present a guest post by Iekuni Ichikawa, who chaired an APRIN committee that recently came up with a new checklist for such investigations, about the effort.

The procedures currently employed by various institutions in Japan are highly variable; hence there is a risk that complainants or respondents might be treated unfairly and that the public might not be informed of the facts of the matters. We organized the Research Misconduct Investigation Standardization Committee of APRIN in July 2017 to propose standardized procedures for handling investigations of alleged research misconduct. Here, we present the "Checklist for Investigating Allegations of Research Misconduct," the fruits of our discussions.

The List

Our "Checklist for Investigating Allegations of Research Misconduct" (hereafter, The List) describes critical points for each stage of investigations in chronological order starting from receiving allegations through preparing final reports. The List further calls attention to "Actions," reminding, for instance, about recommending the suspension of the use of outside funds at an appropriate time, and to "Conformity with rules," which emphasizes that investigations should conform to rules and regulations drawn up by research organization, government ministries, and funding agencies. As such, The List also serves as a tool for self-checking when preparing reports. The applicability of The List is not limited to medical and life sciences; it is intended for use in all areas of research, including science, technology, humanities, and social sciences.

In preparing The List, we referred to "the Guidelines for Responding to Misconduct in Research" from the Japanese Ministry of Education, Culture, Sports, Science and Technology (effective August 26, 2014) and the article, "Institutional research misconduct reports need more credibility" (Gunsalus et al. JAMA 319: 1315-1316, 2018, published as a statement of the Expert Meeting held in Chicago, Illinois, U.S. in December 2017). This article presents a "Peer Review Form for Research Integrity Investigation Reports" which lists key aspects of investigation reports for quality evaluation. In contrast, The List itemizes critical issues that must be considered when initiating, conducting and reporting the results of investigations.

We wish to add that The List will require revision in the future as the concept of research misconduct changes along with methods of research.

About APRIN

APRIN was founded in April 2016 by volunteers who commit themselves to the promotion of research of high integrity. APRIN's activities include, among others, providing e-learning material for research ethics education.

Three Days International Seminar on
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Organised by:

Department of Botany, University of Gour Banga, Malda, West Bengal, INDIA

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2. Plant and Microbial genomics, proteomics, and metabolomics
3. Plants -microbes interaction: An inseparable interdependence
4. Abiotic and biotic stress responses in plants and microbes
5. Plant reproduction and Development
6. Reproductive biology studies in conservation and recovery of a species
7. Food security, safety and sustainability for the future
8. Trans-disciplinary approach in plant and microbial research

CALL FOR PAPERS: The participants for the seminar are invited to submit abstracts for oral or poster presentation. Kindly submit abstracts - between 200 to 250 words, with 4-6 key words and 5-10 references of your proposed presentation at the seminar website: *www.camps2019.org*. The abstract book will be published with ISBN.

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*[Registration fee only covers - Conference kit, Breakfast, Lunch, Dinner and High Tea] *A certificate in prescribed format duly forwarded by the Supervisor and HoD should be submitted during registration. For Registration please visit seminar website.*

IMPORTANT DATES:

Opening of Seminar website	:	31st October, 2018
Abstract submission opening	:	01st November, 2018
Abstract submission closing	:	31st December, 2018
Early Registration ends	:	31st December, 2018
Late Registration up to	:	31st January, 2019*
Acceptance notification	:	05th February, 2019

**In case of late registration, participants have to pay INR 500/- extra (in addition to their registration fee).*

CLIMATE DURING THE SEMINAR: The climate of Malda during the Seminar will be cool and pleasant. Average Temperature: max 28°C and min 16°C. Dense fog with light rain. Light woollen clothes and umbrella is required.

ACCOMMODATION: Private lodges, hotels at reasonable rates and star category hotels are available near the campus of University of Gour Banga (Mokdumpur, Malda, NH 34). Delegates are requested to arrange their own accommodation as per their convenience earliest.

For any query, please contact:

Dr. Abhijit Sarkar/ Dr. Sukanta Majumdar ☎: 9163614292/ 8768333983 ✉: abhijitbhu@gmail.com/ smajumdarwbes@gmail.com

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- Ramifications for Indian life sciences companies' market offerings, business models & the new capabilities needed as health care & technology merge to become "health technology."

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NOTIFICATIONS

CCMB Summer Program-2019

summertraining.ccmb@gmail.com

Eligibility Qualifications The training program is open to students from all branches of sciences and open to all Indian Universities/Research Institutes.

M.Sc. Program: Students admitted in year 2018 and will complete their 1st year in June/July 2019
4 Year B.Tech. Program: Students admitted in year 2016 and will complete their 6th Semester in June/July 2019.
5 year Integrated B.Tech.-M.Tech. or MBBS course: Students admitted in year 2015 and will complete their 8th Semester in June/July 2019; MBBS students in any year of their study can apply.

M. Tech. students are not eligible.

Computer science students with flair for biology may also apply.

Application procedure

Application for the Summer Program 2019 can be downloaded (Zipped pdf file). Completed application (Hard copy) for the program MUST reach CCMB by 07/02/2019. The names of the Selected candidates will be made available on CCMB homepage during the middle of March 2019 (around 15/3/2019); here, it may be noted that no separate intimation would be sent to any candidate, and thus all applicants must look for his/her name in the 'selection list' on the CCMB homepage only.

Important dates
The program is for duration of 60 days (~eight weeks) in the months of May-July 2019.
Last date for receipt of Application in CCMB: 07 February 2019
List of the selected candidates on CCMB homepage Middle of March 2019. (There will NOT be any separate letter of intimation to the selected candidates)
Last date for selected candidates to inform their: Acceptance to CCMB/Program Coordinator 30 March 2019
Tentative date to join CCMB/the program 20th May - 3rd Jun 2019 (No candidate will be allowed to join after 3rd June under any circumstance)

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ARUNAI Engineering College TIRUVANNAMALAI

4th International Conference on

"BIOENERGY, ENVIRONMENT AND SUSTAINABLE TECHNOLOGIES"

January 28-30, 2019

BEST 2019 Towards tomorrow

CALL FOR PAPERS

Themes of the Conference

Bioenergy and Renewable Energy
Environmental Biotechnology
Waste Management and Valorization
Water Research
Climate change
Policy makers and the Public
Special Sessions on General Engineering

- *Biotechnology & Chemical Engg*
- *Pharmaceutical Technology*
- *Nano Technology*
- *Solar Energy Technology*
- *Sustainable Technologies*
- *Smart cities*
- *Robotics & Artificial Intelligence*
- *Internet of Things (IoT)*

Important Dates

Abstract submission due - 25th Oct 2018
Acceptance notification - 30th Oct 2018
Registration opening - 31st Oct 2018
Full paper submission - 30th Nov 2018

Associated Journals

- *Journal of Energy and Environmental Sustainability (JEES)*
- *The International Journal of Environment and Sustainable Development (IJESD)*
- *More SCI and SCOPUS indexed journals will be updated in the conference website.*

Sponsors & Associates

The Biotech Research Society, India

International Bioprocessing Association

International Society for Energy, Environment and Sustainability (ISEES)

Centre for Energy and Environment Sustainability (CEES)

Biotech Express Magazine

Contact details

The Organizing Chairman, BEST2019, Arunai Engineering College
Tiruvannamalai – 606603, Tamilnadu, India
Phone: +91 4175 255101, 255124, Mobile: +91 94887 73165
Mail: icbest2019@gmail.com

For more details visit : www.best.biotechpage.com, www.arunai.org

Scan the QR code to visit conference website

मोतीलाल नेहरू राष्ट्रीय प्रौद्योगिकी संस्थान इलाहाबाद
प्रयागराज–211004,भारत
Motilal Nehru National Institute of Technology Allahabad
Prayagraj-211004,India

Advertisement No. 01/2019, Dated 07.01.2019

Recruitment for Faculty Positions of Assistant Professor in Various Departments of Institute

Pay scale: ₹15, 600-39,100 PB-3, AGP ₹6000/7000/8000 [equivalent 7th CPC pay level 10/11/12]

Online applications are invited from interested candidates for teaching posts at the level of Assistant Professor in various departments of the Institute. For further details and application form please visit the Institute website http://www.mnnit.ac.in.

Last date of submission of online application is **31.01.2019**.

Hardcopy of duly filled online application form along with self-attested all supporting documents, and application fee details must reach to the following address latest by **05.02.2019** upto 5.30 P.M.

The Registrar
Motilal Nehru National Institute of Technology Allahabad
Prayagraj-211 004, Uttar Pradesh, India

DIRECTOR

Department of Biotechnology
Ministry of Science & Technology
Government of India

Indo-Australian Biotechnology Fund

CALL FOR PROPOSALS
(11th Round)

Applications are invited for joint research projects to be implemented by Indian scientists in collaboration with the Australian counterparts. The priority areas of research for Round Eleven of the *Indo-Australian Biotechnology Fund* are:

1. **Plant genomics**

2. **Neurodegenerative diseases, including palliative care**

Call for proposal is open from **14th December, 2018 to 23rd January, 2019**.

On the Indian side, Applicants for funding should submit the completed application form Five (5) hard copies and a soft copy in a CD and one soft copy through single by e-mail) with all relevant, clearly labelled attachments to the following address:

Dr. Suraksha S. Diwan, Scientist 'E', Department of Biotechnology, Block-3, 5th Floor, **Room No. 517**, C.G.O. Complex, Lodi Road, New Delhi - 110003, e-mail: ssdiwan.dbt@nic.in

Please visit www.dbtindia.nic.in for detailed advertisement, guidelines and Application format.

DEPARTMENT OF BIOTECHNOLOGY
Ministry of Science & Technology
Government of India

Indian Biological Engineering Competition (iBEC-2019)

PRE iGEM 2019

For supporting best Indian Students team to participate in iGEM Competition-2019

Details of Eligibility can be access from here

Registration Form can be access from here

Soft copy of the proposal can be send to the undersigned E-mail address followed up by the hard copy of the same to the undersigned office address.

IMPORTANT DATE

February 28th, 2019
Last Date for proposal submission

(*Grant of Release is subject to proof of registration and signing of MoA)

For and other issues, kindly contact concerned officer:

Dr. Sangita M. Kasture
Scientist
Room No. 717, Block -2 ,C.G.O. Complex
Department of Biotechnology
Ministry of Science & Technology
Government of India
Lodhi Road, New Delhi-110003, INDIA

Email: sangita.kasture@nic.in

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The only Strong foundation course of in-depth analysis of PM in LS

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Dr. Vijay Chandru, Ph.D.
Chairman & MD
Strand Life Sciences

Dr. Vamsi Veeramachaneni, Ph.D.
Chief Scientific Officer
Strand Life Sciences

BEST VALUE

Training fee

Rs. 30,000 only
Course materials, Tea-break, lunch included

Date & time

2.00 pm – 9.00 pm
1st – 3rd & 8th – 10th Feb 2019

Venue

Bionest-UoH
School of Life Sciences
Gachibowli, Hyderabad

Students shall be from Life Sciences Background and bring their own laptop

COURSE HIGHLIGHTS

- Communication, team building & General principles of PM
- Drug development & translational research
- Data driven decision models & Project selection
- Organizational change & Process improvement

CONTACT

+91 9160011551
+91 7842129697

Level 4, Regus Business Center, Naga Chambers, Waltair Main Road, Visakhapatnam –530002

44th Annual Conference of the Indian Society of Human Genetics

ISHG-2019: Genomics for Health and Precision Medicine

30th Jan to 1st Feb 2019; jointly organized by National Institute of Biomedical Genomics (NIBMG) and University of Kalyani (KU), Kalyani, WB, India

The Indian Society of Human Genetics

REGISTRATION NOW OPEN

Registration Guidelines:

Follow the steps shown below for registering yourself in the conference-

Download the Registration form HERE

Fill all the details accurately along with any accommodation you may need to attend the conference.

Please note that if you need accommodation to attend the conference you should pay both the registration and the accommodation fees TOGETHER and give the details of the payment made in the Registration form.

- *All the fees should be paid by bank DD/personal cheque ONLY, no other form of payment will be accepted; Please make the payment for the correct amount as calculated and shown in your Registration form.*
- *Make your payment by drawing a bank Demand Draft (DD)/personal cheque in the name of,* **"ISHG Annual Meeting 2019"** *Payable at* Kalyani.
- *Make a scanned copy of your DD/cheque.*
- *Please send the completed Registration form along with the scanned copy of your DD/cheque to the e-mail ID:* **reg.ishg2019@gmail.com**
- *You will receive a temporary registration number from us within two working days after you have sent your Registration form and the scanned copy of your DD/cheque by e –mail.*
- *Please send the hard copy of the DD/cheque to the address:*

Dr. Srikanta Goswami
Assistant Professor
National Institute of Biomedical Genomics
P.O.: NSS, Kalyani, Nadia, West Bengal-741251

- After receipt of the hard copy of your DD/cheque, your registration is COMPLETE and you will receive a permanent registration number.

Registration Fees: **ISHG members (Early) Till 25th Dec 2018;**

BSc/MSc/MBBS students/Project persons	*Rs. 2,500/-,*
PhD students/Post-docs	*Rs. 3,500/-,*
Faculty/Scientists	*Rs. 4,500/-,*
Accompanying Person	*Rs. 4000/-*

(Late) From 26th Dec 2018 to 25th Jan 2019 *Rs.* ***500/-*** *extra for each of the above categories*

Non-ISHG members will pay Rs. ***500/-*** *in addition to the above charges, other criteria remain same*

Accomodation Charges Extra:

Rs. 1000/day for single occupancy
Rs. 500/day for double/triple occupancy

Have any questions? Pl. write to us: **ishg.jan2019@gmail.com**

ISHG-2019

Local Organizing committee:

President: *Professor Partha P. Majumder, Distinguished Professor and Founder, NIBMG*

Vice President: *Professor Rita Ghosh, Dean of PG Faculty of Science, KU*

Secretaries: *Dr. Sreedhar Chinnaswamy, NIBMG, and Dr. Ashis Kr. Panigrahi, Dept. of Zoology, KU*

Treasurers: *Dr. Srikanta Goswami, NIBMG, and Dr. Manas Sanyal, KU*

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DEPARTMENT OF BIOTECHNOLOGY
Ministry of Science & Technology
Government of India

सत्यमेव जयते

Biotechnology Industry Research Assistance Council
(A Govt. of India Enterprise)

Announces call under

National Biopharma Mission

(Funded jointly by Department of Biotechnology and World Bank)

Industry-Academia Collaborative Mission for Accelerating
Discovery Research to Early Development of Bio-pharmaceuticals -
"Innovate in India (i3) Empowering biotech entrepreneurs & accelerating inclusive innovation"

This call is to seek applications for the development of Biosimilars, Engineered Cell Lines and Establishing / Strengthening facilities for Biopharmaceuticals.

Focus of the Call

Biosimilar Product Development
Clone development / Preclinical / Clinical Phase

Cell Line Engineering / Cell Line Development
To establish a platform technology for Production of Biopharmaceuticals

Establishing / Strengthening Facilities
- Cell Line Repository
- Process Development Laboratory (PDL) and GMP Manufacturing (CMC Facility)
- GLP compliant Bioanalytical Facility

How to Apply: Proposals to be submitted online only.
For online submission please log on to **www.birac.nic.in**
For details on Request for Proposal (RFP) and mission document, log on to:
www.birac.nic.in/nationalbiopharmamission.php

Call Opens:
30th December 2018
Last Date of Submission:
15th February 2019 (5:00 PM)

For queries please contact:
Mission Director, PMU-NBM: **technical.birac@gov.in,** Senior Program Manager, PMU-NBM: **nbm1.birac@nic.in**