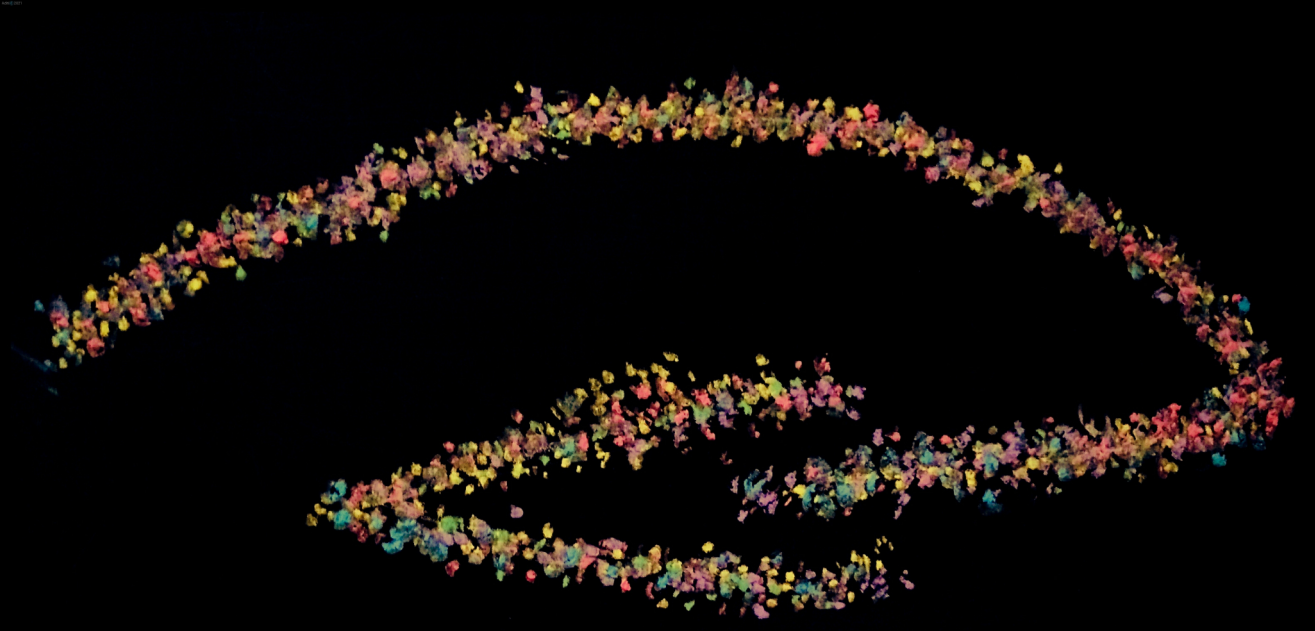
October, 2021 Volume 1, Issue 4

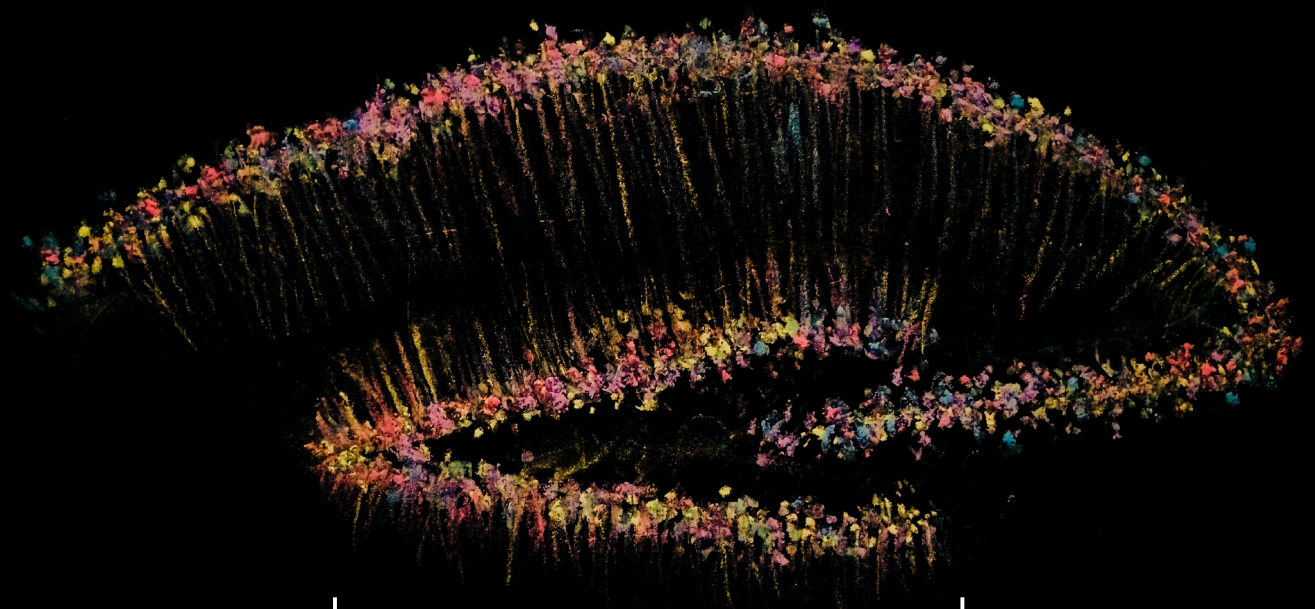
Neuroletter

The official newsletter of Project Encephalon



Picture by Aditi Bishnoi

Page 18 | A Neuropiction entry



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Harsh Srivastava, Associate Editor

From the desk of the

EDITOR

Neuroletter is just one of many efforts by Project Encephalon to promote and communicate neuroscience. It gives me immense pleasure to bring forward the October edition of our Neurolettter. In this edition, we get a sneak peak into Project Encephalon's Brain awareness week, a 'Why Neuroscience?' section, an overview of the strides in the field of neuroscience in the month of October and much more. We've tried our best to bring forward the beauty of neuroscience and we hope that fellow neuro-enthusiasts will find it useful.

Profile by Ankush Chakraborty

Harshini Anand, Assistant Designer

VOLUNTEER

Of the month

Harshini is one of the most talented artists in Project Encephalon's team. Her insights and creativity know no bounds as is evident from her work.

Her designs have been instrumental in organising Project Encephalon Brain Awareness Week 2021. Her ability to come up with designs far better than can be imagined within very short time frames is surreal, which is one of her many qualities that the Project Encephalon family holds in very high regard.

PROJECT ENCEPHALON

BRAIN AWARENESS WEEK

PEBAW

The Brain Awareness Week (BAW) is the global campaign to increase public awareness of the progress and benefits of brain research. Project Encephalon's Brain Awareness Week (PEBAW) was organised to explore various aspects of neuroscience to learn about how awesome the brain is! There were talks, competitions, and career mentorship sessions to increase the awareness of neuroscience in everyday life. It was organised on September 18th, 19th, 25th and 26th.

11 countries

Speakers **14**

24 volunteers

Participants **300+**

SPEAKERS

Click on the topic to watch their lecture on our youtube channel.

Orish Chinna, MBBS, PHD, is a senior lecturer and holds a PhD in Anatomy. She is a faculty in Department of Anatomy, University of Port Harcourt, Nigeria. She is the founder of Women in Neuroscience Nigeria and Youth Neuroscience Association of Nigeria. Her current project is on mechanistic considerations of natural antidotes on environmental toxicants induced neurodegenerative changes in animal models.

Brain Anatomy

Dr Chinna Orish

Bittu Kaveri Rajaraman is an Associate Professor of Biology and Psychology, and is the the current Head of the Psychology Department. He recieved his PhD from Harvard University in neuroscience and then, a DST-Kothari postdoctoral fellow at the Center for Ecological Sciences, Indian Institute of Science and then an INSPIRE faculty fellow at the Central University of Hyderabad.

Behaviour

Dr Bittu K R

Camila Demaestri received her BS in Psychology at Northeastern University and is currently a PhD candidate in Neurobiology and Behaviour at Columbia University. Her research focuses on studying how the brain chages in respnse to adversity early in life, leading to anxiety and fear related pathology in adulthood.

Neurodevelopment

Camila Demaestri

Lauren is a III year PhD candidate at the University of Western Australia and the Perron Institute for Neurological & Translational Science, with a background in both Psychology and Neuroscience. Her research involves using a form of brain stimulation for treating depression, known as ‘low intensity-TMS’. Her research aims to help us understand more about how treatment works on a biological level.

Brain Stimulation

Lauren Hennessy

Optogenetics

Dr Komal Kampasi

Komal is a strong advocate for neuroscience and an optical neurotechnology lead at Lawrence Livermore National Laboratory, California where she has served USA's Federal research wing of Science & Technology. She received her Bachelor's degree (2010) in Electronic Engineering from University of Mumbai and Master's (2012) and Doctorate (2017) from University of Michigan. Her research interests include brain-machine interfaces, nanotechnology and medical devices.

Neuroethics

Dr Eric H. Chudler

Eric H. Chudler (PhD) is a research Associate Professor in the department of Bioengineering at the University of Washington, Seattle and the executive director of the Center for Neurotechnology. He is a neuroscientist who also works with teachers to create materials to help people learn about brain.

Neuroscience of sleep

Dr Krishna Melnattur

Krishna Melnattur is an Assistant Professor of Psychology and Biology at Ashoka University, India. He obtained a PhD in 2008 from the University of Massachusetts, Amherst and was a postdoctoral fellow at the National Institute of Health, Bethesda. He is interested in understanding how brains generate adaptive behaviours by using various techniques such as circuit traing tools & behavioural measurements.

Another GABA- the scepter

Dr Palok Aich

Dr Palok is an Associate Professor at the School of Biological Sciences, NISER. He has a PhD in Biophysics from Saha Institute of Nuclear Physics. He developed multiomic approaches to quantify stress. Currently, he is working on understanding the role of gut microbiota in regulating the Gut-Adipose-Brain axis and identifying unique signatures at the metabolite and microbiome level. His previous work fetched him the Canada Innovation Award for his invention of a novel DNA molecule, M-DNA.

Stress & mental health

Dr Mala Murlidhar

Dr Mala Murlidhar is a consultant psychologist working in the area of mental health for more than 15 years now. Her specialisation is in Child and Adolesent mental health. She runs a clinic called 'MindSights' where she practices regularly and also works with corporate hospitals. She has her expertise in CBT, DBT, Psychodynamic therapies and other supportive therapies.

Shashank (they/she) completed their BE in Biotechnology from NSIT, University of Delhi. Fascinated by neurodegenerative disorders and the underlying cellular mechanisms, they finished their Bachelor's thesis at IGIB, Delhi. Currently, they're a PhD student at the Centre for Neuroscience at the Indian Institute of Science, working on unraveling the neural circuits that enable complex motor behaviours.

Neuroscience of touch and pain

Shashank VA

Claude Desplan is a Silver Professor of Biology and Neuroscience at NYU. He received his Dsc at INSERM in Paris in 1983 and joined Pat O'Farrell at UCSF as a postdoc. There, he demonstrated the homeodomain is a DNA binding motif. In 1999, he joined NYU where he investigates the generation of neural diversity using the Drosophila visual system. He is a member of the US National Academy of Sciences.

How do eyes adapt to the visual world of animals?

Dr Claude Desplan

Holly Hunsberger is a post doctoral research scientist with a dual appointment at Columbia University and the New York State Psychiatric Institute. She received her PhD from West Virginia University in the area of behavioural neuroscience. There, she studied glutamate's role in Alzheimer's disease pathology using novel micro-electrode array technology.

Learning & memory

Dr Holly Hunsberger

Goldy is a Postdoctoral research scientist at Université Catholique de Louvain (Belgium). She received her Bachelor's degree in Zoology from the University of Delhi, and her Master's & PhD from IIT, Gandhinagar. During her doctoral tenure, she was awarded the Fulbright-Nehru doctoral fellowship to work at the NIH, Maryland, USA. She is interested in understanfding how humans acquire new skilled movements & the mechanisms that influence their retention & generalization.

Movement: Mastering a skill

Dr Goldy Yadav

Matt is a registrar in Psychiatry & a clinical academic. He graduated with Undergraduate medical & Post Graduate degrees from the University of Manchester before moving to work at South London & Maudsley mental health trust. He is currently based at the Institute of Psychiatry, Psychology & Neuroscience at King's college, London, researching neuropsychiatric disorders & psychopharmamacology.

Neuroscience of taste & smell

Dr Matt Butler

Neuro story

All stories will be published soon on our blog projectencephalon.org and subscribe to get added to our mailing list. Stay tuned. Head over to

A writing competition was organised during PEBAW. We received many entries & we had 3 winners, in no particular order. All winners received brain themed T-shirts.

1 Turning the switch on? : Ethical Issues of Deep Brain Stimulation for Psychiatric Disorders

By Yerram Pooja Chowdary, Katuri Medical College

2 Changing the brain's real estate

By Aarushi Chitkara, Second Year Bsc-Life Sciences student, St Xavier's College, Mumbai

3 Déjà vu demystified

By Anandita Chandran, R N Podar School, Khar, Mumbai

1

During the 1950s, the first experimental neuromodulation via brain electrodes was performed in patients with psychiatric disorders (Heath, Russell, Monroe, mickle, 1955). Since then, more than 120,000 neurological patients have been treated with Deep Brain Stimulation, whereas an estimated of only 500 psychiatric patients received DBS treatment. Why is that? The answer lies back in the 1900s. With the ambivalent history of psychosurgery in mind, it is utterly comprehensible that even a reversible though (minimally) invasive technique like DBS invokes ancient fears. For instance, "The lobotomies performed by Moniz and freeman or the Tulane electric stimulation program by heath". Popular fiction works, such as One Flew over the cuckoos Nest or The Manchurian Candidate, in which brain interventions are used to manipulate or abuse people , cross one's mind…….Read more

2

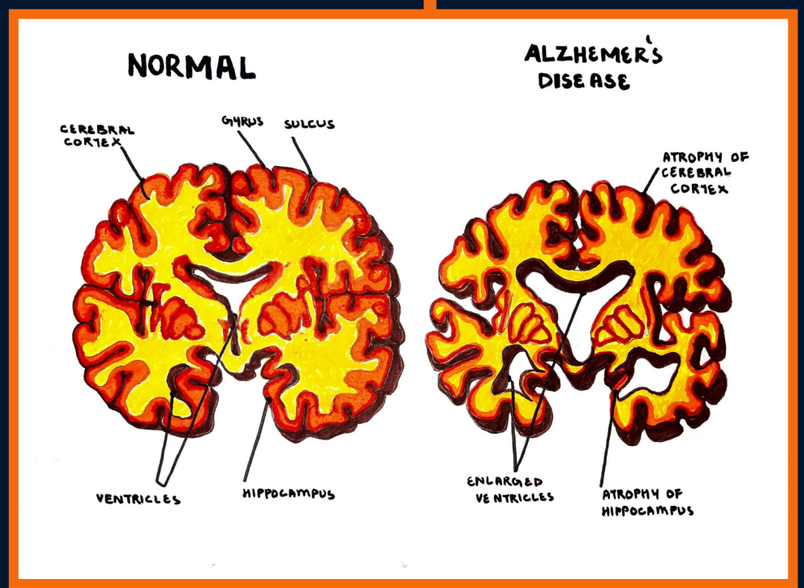
We all use Google maps to move between towns and cities; every state is in its spot, and every country is on its continent. However, if someone said that the maps alter each day one wakes up from a nap? One would think the idea is absurd, but this is accurate when it comes to one's brain; every activity carried out, and every decision made changes the brain a little. What does that mean? Is the brain plastic? Every region in the brain is associated with carrying out a particula……Read more

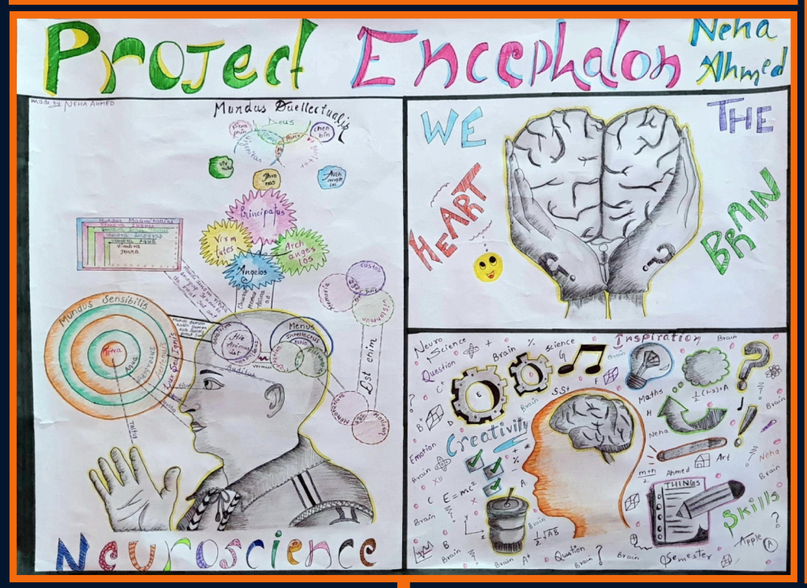
3

Have you ever felt a flash of striking familiarity whilst encountering a completely unfamiliar situation? It's as if you've been to the exact same place and done the exact same thing - except, you actually haven't. Well, you're certainly not alone. Nearly 66% of the human population experiences this phenomenon upto several times a year. Termed 'déjà vu', the french for 'already seen', this happening can formally be defined as 'the illusion of remembering scenes from events expe…Read more

Neuroart

Neuroart was organised inviting artworks and comics on neuroscience and allied fields. We received some amazing entries. Three winners were chosen, in no particular order. All winners were gifted brain themed T-shirts.





1st Sai Aasritha, Mrunal Kulkarni, Osmania University

2nd Neha Ahmed, Dayalbagh Educational Institute

Differences in brain structure between siblings make some more susceptible to developing severe antisocial behavior

A new study reveals differences in brain structure between antisocial and non-antisocial members of the same families which could explain why some show violent behavior whilst others do not.

DOI: 10.1017/S0033291721003202

Charting hidden territory of the human brain

Neuroscientist shave discovered a novel, non-invasive imaging-based method to investigate the visual sensory thalamus, an important structure of the human brain and point of origin of visual difficulties in diseases such as dyslexia and glaucoma.

DOI: 10.1016/j.neuroimage.2021.118559

Bat study reveals secrets of the social brain

Neuroscientists used wireless devices to record the neural activity of freely interacting Egyptian fruit bats, providing researchers with the first glimpse into how the brains of social mammals process complex group interactions.

DOI: 10.1126/science.aba9584

Gene therapy can restore vision after stroke

Vision loss can be a side effect from stroke. Neurons don't regenerate, and stem cell therapy is costly, difficult, and chancy. Researchers have figured out a way to use gene therapy to recover lost vision after a stroke in a mouse model.

DOI: 10.3389/fcell.2021.720078

This month in Neuro Science

Source: https://www.sciencedaily.com/news/mind_brain/neuroscience/

Drug helps sensory neurons regrow in the mouse CNS

An FDA-approved drug acts on support cells in the CNS to encourage sensory neurons to regrow after injury.

DOI: 10.7554/eLife.68457

'Caramel receptor' identified

The olfactory receptor that contributes decisively to the smell of caramel was unknown until now. Researchers have now solved the mystery of its existence and identified the 'caramel receptor.' The new knowledge contributes to a better understanding of the molecular coding of food flavors.

DOI: 10.1021/acs.jafc.1c03314

'Mammalian motivation circuits: Maybe they're born with it

Are animals born to seek rewards or avoid punishment? Researchers found that mice have pre-programmed neurons and circuits that process 'positive' and 'negative' stimuli. Their findings may be useful for studying neurological and psychiatric disorders in humans.

DOI: 10.1038/s41593-021-00927-0

Neuro Notes

Music & Brain Plasticity

Authors

1 Dr Harsh Srivstava,
Associate Editor,
Project Encephalon

2 Bhagyajyoti Priyadarshini,
Associate Editor,
Project Encephalon

Abstract

Neuroplasticity is the ability of neurons to modify connections. Music has been proven to cause structural and functional changes in different areas of the brain. These changes also lead to the development of skills that may or may not be related to music. The mechanism behind these changes is not completely known however few hypotheses have tried to explain it such as the activation of the dopaminergic mesolimbic system. The association of brain plasticity with music has allowed researchers and clinicians to develop various music-based interventions. These interventions have been found useful in patients of stroke, dementia, Parkinson's, epilepsy etc.

Read the full article here.

Project Encephalon &
The Science Paradox
Collaboration article

Web of emotions

Written by

1 Aditi Kulkarni,
The Science Paradox

Illustrated by

2 Aiswarya P S.
Project Encephalon

Edited by

3 Luminaa Anandh,
The Science Paradox

4 Maalavika Govindarajan,
Project Encephalon

Abstract

Have you ever heard someone say, “That a person doesn’t think before speaking” or “That person is too emotionally wrapped up to think rationally”?

What are these emotions? What are feelings? Is it just happiness, sadness, anger or fear or are there many other complex emotions that come to play?

Have you ever wondered why you hate cats and love dogs so much or vice-versa? Why do you feel sick in the pit of the stomach before writing an exam, or have tears in your eyes while listening to a sad song, or even laugh while watching your favorite comedian in action? In essence, how does your body know which emotions to feel, when to feel them and why? And this is exactly the topic that we will explore in this article.

Read the full article here.

Why Neuroscience?

Neurosience is a beautiful and diverse field. We were curious about what drove people towards their respective branches. We asked our discord community about what made them choose their branch of neuroscience. Here are a few of the best responses.

My branch of neuroscience is instrumental in understanding mechanisms of the developmental and degenerative processes that occur in multiple in vitro and in vivo platforms and is the first step that could eventually lead to translational solutions to various neurological disorders. [Molecular and Cellular Neuroscience]

Maalavika Govindarajan, Pennsylvania State University

Upasana Gupta, Indian Institute of Science

A renowned behavior biologist once told me, "the ultimate goal of having neurons is to produce a behavior. That's why neurons exist and talk to each other, so that they can give rise to an outcome. Else why would they be there?" This stayed with me, and the question of course, how do neurons decide on a particular outcome, especially in the case of spontaneous behavior and how they form such precise connections during development. [Developmental Neurobiology]

The ability to model neurons/circuits to explain certain phenomena (E.g., how would a circuit of V1 neurons interact to lead to visual perception) is something that intrigues me, and I would love to make a biologically-realistic model of the brain to explain features like attention someday. [Computational & Systems Neuroscience]

Harshith Nagaraj, Indian Institute of Science

Ankush Chakraborty, Panjab University

I was interested in studying how psychedelics affect the brain to cause hallucinations and how magnets can be used in neuromodulation. Later on I found out that both of these are used to treat depression. I remembered what Dr. Partha Mitra had said when asked about him choosing his field, "I chose a problem that wouldn't be solved in my lifetime, but I can help make significant strides." [Neuropsychology of depression]

Neuroscience should be inspired because we get to know and research about the only thing which makes us think, function and live - the brain. It's the brain wanting to know about itself which makes Neuroscience inspiring. The brain and the entire nervous system still surprises us with many unknown facts yet and makes us work more on it to get to know the system briefly. [Neurophysiology]

Subhiksha Srinivasan, SRM I/o Science &Technology

Sapiens in Neuroscience

Dr Poonam Thakur, Assistant Professor,
School of Biology, IISER

Perhaps nothing defines the role of a mentor in a researcher's life than these celebrated lines from the 1982 song by Larry Henley and Jeff Silbar. Unlike many, I am very fortunate to have amazing mentors who supported me and guided me along the way. But it was not always like that. Growing up, with no exposure to 'now- ubiquitous' internet or suitable guidance, I was largely ignorant about a career in science.

During my school days, I remember being a curious child and often bugging my teachers with questions beyond textbooks. I was always a bright student in my school or at least so did my classmates and teachers tell. After completing senior secondary exams, when the time came to choose a career path, I did not have anyone guide me. All I felt was that I did not want to take the well- trodden path of medicine or engineering. I wanted to pursue science and ended up joining BSc Biophysics. Since I had a predominantly mathematics background, I was totally clueless about the biology courses that I was pursuing, during my initial years of bachelor's. Often, I would consider my choice of joining Biophysics and the fact that I was the first person in my entire extended family to study science, did not help either. It is only towards the third year of my bachelor's that I started understanding and eventually enjoying biology. I was awarded a gold medal for the first rank in BSc Biophysics. Buoyed by my success in the last year of BSc, I decided to continue with Masters in Biophysics. During the second year of my Masters, I had the taste of working on a research problem. This proved to be a turning point for my career. I still remember the butterflies in my stomach before a critical experiment. This was also the first time when I encountered genuine guidance from my first mentor Prof SN Sanyal. He was always encouraging and persuaded me to tak...Read more

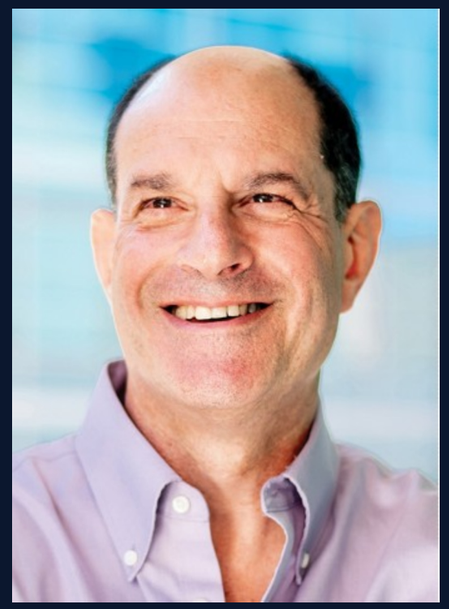
> "I could fly higher than an eagle, For you are the wind beneath my wings

Image credit: Noah Berger (Julius), Scripps Research (Patapoutian)

Nobel Prize in Physiology or Medicine

Advanced information. NobelPrize.org. Nobel Prize Outreach AB 2021. Sun. 31 Oct 2021. <https://www.nobelprize.org/prizes/medicine/2021/advanced-information/>

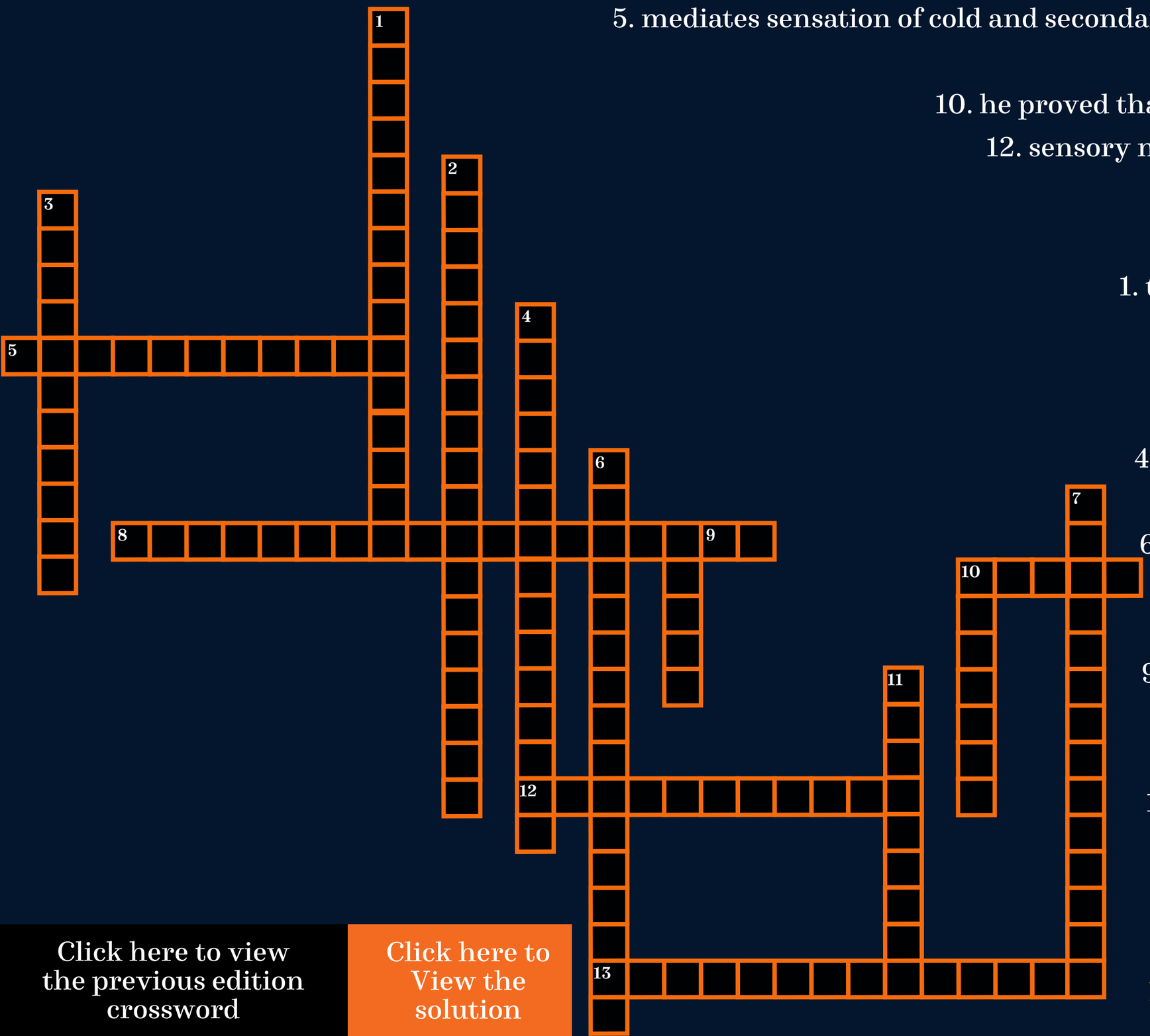
The 2021 Nobel Prize in Physiology or Medicine is awarded to David Julius and Ardem Patapoutian for their discoveries of thermal and mechanical transducers. The question of how we sense the physical world through somatic sensation has fascinated humankind for millennia. During the first half of the 20th century, it became clear that temperature and pressure activate different types of nerves in the skin. However, the identity of the molecular transducers responsible for detecting and converting heat, cold and touch into nerve impulses in the sensory nervous system remained a mystery until the discoveries awarded with this year's Nobel Prize. David Julius wished to identify the cellular target of capsaicin, the pungent ingredient of chili peppers, as he believed this could provide fundamental insights into mechanisms of pain. He used a cDNA library from sensory neurons in a functional screen to look for a gene that could confer capsaicin sensitivity to cells that were normally unresponsive. The screen identified a cDNA encoding a novel ion channel (now called TRPV1) belonging to the family of transient receptor potential ion channels. Importantly, TRPV1 was shown to be activated by temperatures perceived as painful. Following the discovery of TRPV1, David Julius and Ardem Patapoutian independently made another important advance with the discovery of TRPM8, a related cold-sensitive receptor. Several additional TRP-receptors were subsequently identified and shown to transduce thermal information in the somatosensory system. Thus, the seminal discovery of TRPV1 by David Julius opened the door to a molecular understanding of thermosensation. Ardem Patapoutian used a functional screen of candidate genes expressed in a mechanosensitive cell line to identify ion channels activated by mechanical stimuli. Two mechanically-activated ion channels, named PIEZO1 and PIEZO2, were identified and shown to represent an entirely novel class of ion channels functioning as mechanical sensors. Importantly, Patapoutian also demonstrated that PIEZO2 is the major mechanical transducer in somatic nerves and is required for our perception of touch and proprioception. In further work, he uncovered central roles of PIEZO1 and PIEZO2 for many additional physiological functions. The work by the two laureates has unlocked one of the secrets of nature by explaining the molecular basis for sensing heat, cold and mechanical force, which is fundamental for our ability to feel, interpret and interact with our internal and external environment.



Neurocrossword

By Susan Ajith

Click here to fill the crossword digitally



Across

5. mediates sensation of cold and secondary components of cold sensation and pain
8. he discovered nociceptors in 1906
10. he proved that each nerve cell is an independententity
12. sensory neuron that responds to damaging stimuli
13. thermoreceptors that detects warmth

Down

1. temperature-sensitive free nerve endings
2. also known as the capsaicin receptor
3. he won the noble prize for discovery of TRP1 that detect capsaicin
4. unspecialized afferent nerve fibre which sends signals to sensory neuron
6. specialized epidermal cells that respond to environmental stimuli
7. thermoreceptors that detect cold
9. thermoreceptor that reacts to capsaicin and other heat producing chemicals
10. damage or injury to these nerve fibres causes neuropathic pain
11. chemical that binds to the same nerve endings as pain receptor

Click here to view the previous edition crossword

Click here to View the solution

Lookout for solution in the next edition!

Illustrations

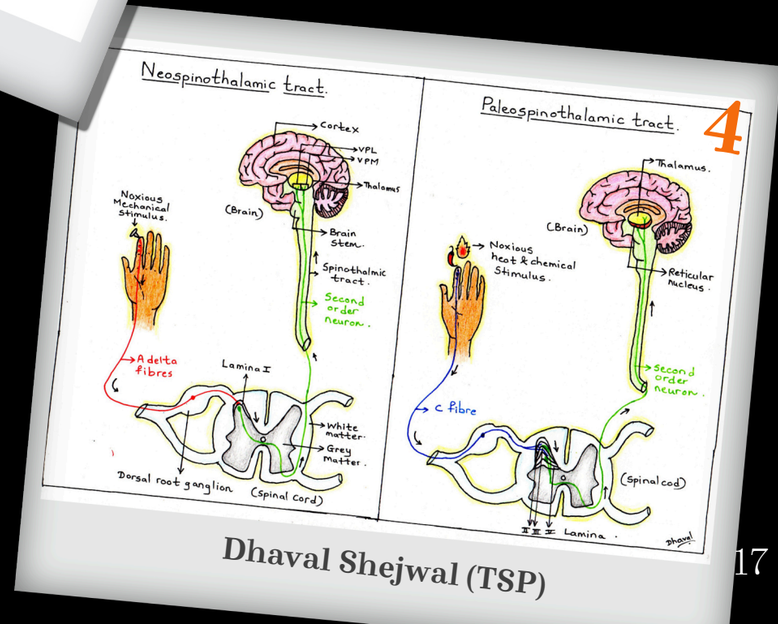
Project Encephalon is grateful to have been associated with some very talented illustrators who have been bringing out the true beauty of our articles. In this edition of our neuroletter we are featuring those artists and their illustrations. To see more of their illustrations and to read the respective articles, click on the respective topics.

[TSP- The Science Paradox]

Aishwarya Girish (TSP) & Aiswarya P S (PE)

Aiswarya P S (PE)

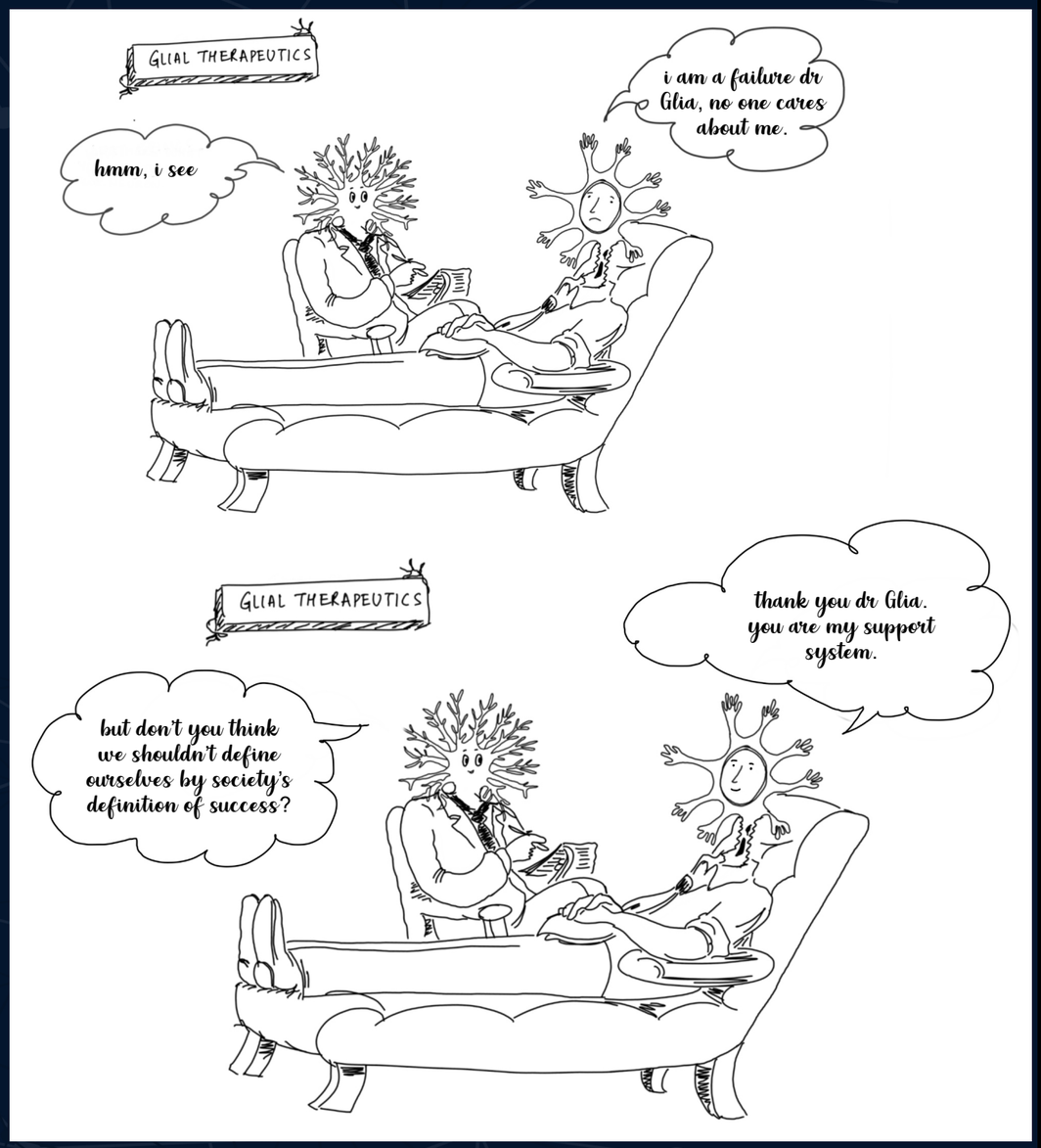
Jaykrishnan Nair (TSP) & Harshini Anand (PE)



Dhaval Shejwal (TSP)

Neurocomic

Comic by @the_astrocyte [Instagram]
If you want to get your comic about neuroscience get published, mail us your entry at pe.editors@gmail.com



About the cover picture

Picture from Aditi Bishnoi (@BishnoiAditi):

Title - Chalk brainbow

Description - Tiny lights in the brain

Author bio - Aditi is a student at IISc Bangalore pursuing her Ph.D. in Neuroscience. She records electrophysiological activity from the rodent hippocampus to learn about spatial memory and navigation.

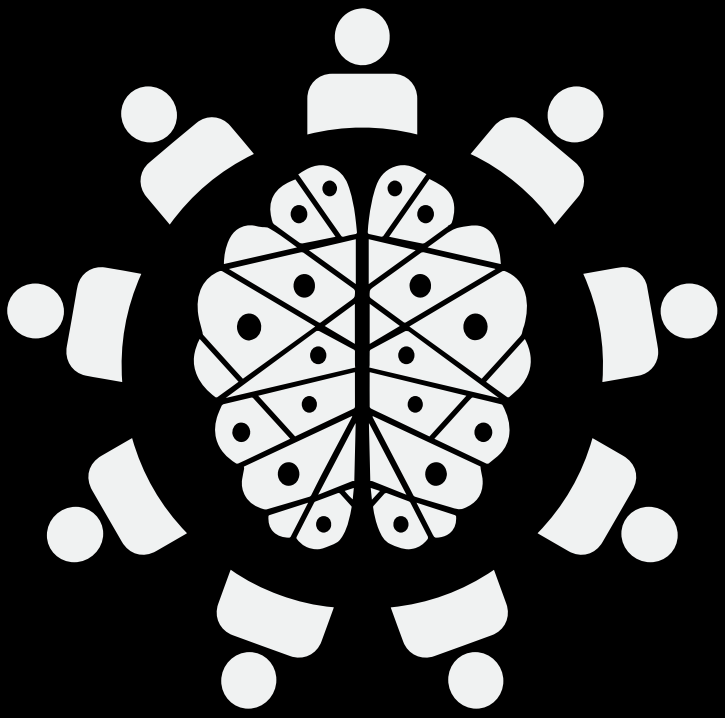
This image was submitted as a Neuropiction entry. If you would like us to feature such images, head over to our website:

https://www.projectencephalon.org/neuropiction

Feedback & Suggestions

Your feedback is valuable to us. Valid critcism will only help us get better in our goal of communicating neuroscience. Do let us know what you feel about our activities or hit us up with any amazing suggestion you may have. To fill the feedback form, click on the link below.

Project Encephalon Feedback form



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www.projectencephalon.org

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