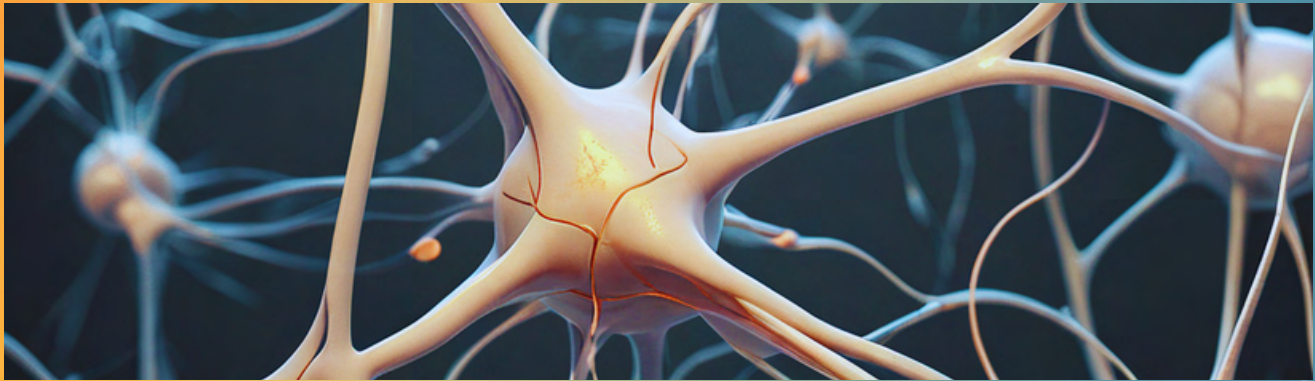


THE BRAIN BLAST

EDITION 7 - HUMAN LIFE CYCLE

UBC Undergraduate Program in Neuroscience Newsletter

4/3/24



Welcome to the seventh edition of The Brain Blast! This month, we're talking all human development, with a little bit about the different stages of life all throughout the newsletter! In this edition, we have special interviews from neuroscience students who presented at the Neuroscience Undergraduate Research Conference, as well as a professor from the Department of Ophthalmology and Visual Sciences.



THIS MONTH'S THEME: HUMAN DEVELOPMENT

Be sure to fill out this month's plasticity themed polls and check out our responses from the last development edition. This edition has some quite interesting results! From the special [study material](#), to labs of the month, this newsletter is packed with information that you don't want to miss, so go on and dig in!



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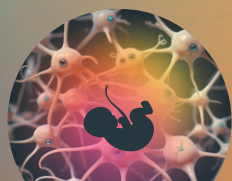
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THIS MONTH IN NSCI 201: FUNDAMENTALS OF BEHAVIOURAL AND COGNITIVE NEUROSCIENCE

This month we've covered three major topics, stress/mood disorders, learning/memory, and language. In our stress unit, we examined the adrenal glands, adrenalcortical hormones, and depression, discussing studies done on newts. Within learning and memory, we learned about the case study of H.M, Alzheimer's Disease, conditioning, and how we can measure memory in rats through the radial maze and the morris water maze. Our language unit touched on Broca's and Wernicke's Aphasia, and some studies on white-crowned sparrows calls and songs. We also had a grad-student datablitz, and a speech language pathologist as a guest speaker talking about what her career encompasses.

THIS MONTH IN NSCI 301: NEUROSCIENCE, ETHICS AND SOCIETY

To start off the month, Dr. Jill Dosso gave us a guest lecture on all things big data, robots, and AI, where we discussed the applications and ethical implications of using technology like large language models in neuroscience. The following two weeks, we had lectures by our TA Jordan. We explored topics in neuroimaging, including as incidental findings in research studies and the implications of fMRI for understanding semi-conscious states. We took a deep dive in to neurotechnology, applying a critical lens to brain training & games and direct-to-consumer EEG. , The next week, Dr. Dosso returned to teach us all about brain-computer interfaces, where we learned about BCIs like neuropixels, myoelectric prosthesis, and speech synthesizers



THE NEURO REVIEW @ UBC

THIS MONTH IN PSYC 371: BEHAVIOURAL NEUROSCIENCE II

We began our third module of the course, taking a close look at all things related to the coordination and modulation of behaviour. We started off with an introduction to the neuroendocrine and autonomic systems, asking questions about the impact of stress on memory and the regulation of homeostasis. We examined oscillatory brain rhythms associated with different brain states, learning about circadian regulation of memory, how we transition between wake and sleep, and the circuits involved with creating different brain rhythms. Fascinating studies revealed the important role of theta and gamma rhythms in memory consolidation, promoting plasticity, and coordinating neuronal populations and different brain regions. Finally, we explored dysregulation and disorders like depression and its connection to stress. We finished off the month with our third test!

THIS MONTH IN BIOL 372: PRINCIPLES OF NEUROBIOLOGY II

In BIOL 372, we began talking about chemosensation! We learned about the differences between olfactory and gustatory coding. Perhaps the most interesting part of these lectures was learning about the insane debate about taste coding in the gustatory cortex! We learned about an absolute madlad named Charles Zuker, who was CONVINCED that taste coding was labelled line. Who could blame him? After all, everyone knows that we only have 5 taste modalities. However, other labs show the complete opposite finding - combinatorial! Human nature has done it again - somehow the most logical explanation may not be the ground truth. Anyways, we also started learning about memory formation in the hippocampus, and how olfaction elicits specific memories. If you've ever wondered why some people like the smell of pool chlorine, and others don't, then take BIOL 372 with Dr. Gordon!

RESEARCH ARTICLES



CARING BABIES: CONCERN FOR OTHERS IN DISTRESS DURING INFANCY

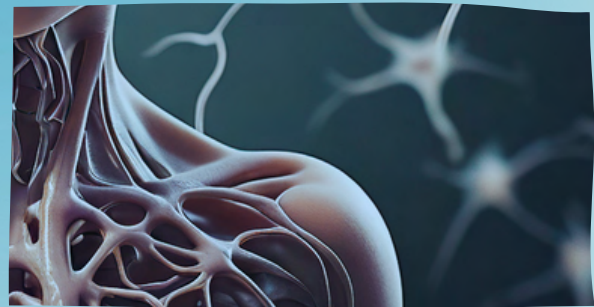
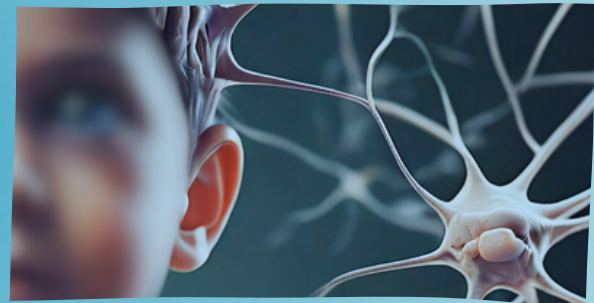
Dive into this month's research article, on empathy development and babies

When someone we care about is going through something traumatic or upsetting, we often feel and express our concern to them. This is called empathy! However, researchers have wondered when exactly this development of empathy actually arises. Can it start as early as when we are babies? Or do we develop this empathy as we grow up into toddlers, teenagers or adults?

In this specific study, where they were attempting to find this out, researchers did a prolonged study of babies at 3, 6, 12 and 18 months of age and looked at their facial responses to other people's stresses over these periods. Here is a little bit about what they found through this study:

Researchers found that babies as young as 3 months were able to display concern for others, which was quite a younger age than previously predicted. It was also found that infants who displayed empathy earlier on (3 and 6 months), had a higher likelihood of displaying empathy at 18 months. It is so insane that even babies are able to express this empathy!

References on last page.



NURC

NEUROSCIENCE UNDERGRADUATE RESEARCH CONFERENCE



JULIA GROENING

TELL US A LITTLE BIT ABOUT YOUR EXPERIENCE AT NURC? HOW WAS THE PROCESS OF CREATING A PRESENTATION

Working closely with other researchers in my lab and pulling from the experiments conducted this past year, I put together a cohesive story on the results we've found in exploring the cell death during oxidative stress in the brain. The key to a good poster is to explain your topic and purpose clearly, while laying it out in a logical fashion. This was essential as it helped guide my presentation at NURC to minimize confusion from my audience.

GIVE US A LITTLE SUMMARY REGARDING THE RESEARCH YOU PRESENTED AT NURC?

My research explored the key cell types and mechanisms implicated in oxidative stress in brain tissue. We determined that pericytes, a cell responsible for vascular regulation, was the predominant dying and dysfunctional cell type in acute rodent brain tissue experiments. This was important as dying pericytes may be a key driver of vascular dysfunction seen during neurodegenerative disorders. It was determined that this cell death was mediated through a Ca^{2+} -dependent pathway, therefore guiding our future pharmacological experiments to identify key channels implicated in this death.

I am a third year neuroscience student in the cellular and molecular stream. I have two major passions in life: music and science. While I'm not writing, performing or recording my own music, you'll find me experimenting in the lab to explore the underlying cellular mechanisms of neurodegenerative diseases. I am fascinated by how our (neuro)biology, whether or not dysfunctional, has a direct impact on who we are and how we experience the world.

FROM NURC, WHAT DID YOU LEARN OUTSIDE OF PRESENTING?

By seeing the breadth of presentation topics at NURC, I was reminded that brain-related research is vast and there are innumerable directions to take when it comes to studying the brain and nervous system. Every subdiscipline is equally important in contributing to our understanding of the brain and how it relates to behaviour and the human experience.

WHY WOULD YOU TELL OTHER STUDENTS TO ALSO GET INVOLVED AND PRESENT AT NURC?

I would recommend any student who is involved in any level of research to get involved with NURC. You learn extremely valuable skills in science communication and research methods which will propel you to excel in both your research and future career. It is also a great, low stakes opportunity to recognize the work you've done and the contribution to science you've made!

WOULD YOU GET INVOLVED IN NURC AGAIN?

NURC is a great opportunity for any and all undergraduate neuroscience research showcasing. I hope to continue working in my lab to have new findings and discoveries to present at NURC next year!

NURC

NEUROSCIENCE UNDERGRADUATE RESEARCH CONFERENCE

I am in my third year of Neuroscience, in the Cognitive and Behavioural Stream. My research interests lie in the field of neuropharmacology, where I am interested in the neural and behavioural benefits or deficits that can result from controlled substances/drugs. At the moment, I am particularly interested in decision-making and the serotonergic system. Outside of the lab and school, I like to do yoga and go hiking.

TELL US A LITTLE BIT ABOUT YOUR EXPERIENCE AT NURC? HOW WAS THE PROCESS OF CREATING A PRESENTATION

I really enjoyed presenting at NURC and being able to see all the neuroscience related research from other students.

Designing a poster is always a challenge because it involves including enough information about the research while not making the poster overwhelming. The writing portion of the poster was a good experience because I had to work through what information was most important. For my poster, I focused on using visuals to communicate my results, because it ensures other people can understand my research. I used BioRender for most of my images and I can't recommend it enough!

GIVE US A LITTLE SUMMARY REGARDING THE RESEARCH YOU PRESENTED AT NURC?

My poster looked at the impacts of microdosing with psilocybin on decision making in the cued rodent Gambling Task (crGT). The crGT is a rodent analogue of the Iowa Gambling Task in humans, where we are able to look at rat decision-making. In each trial, the rat can pick from 4 options: 2 risky and 2 optimal. When a rat chooses a risky option, the reward is much better than the optimal options (more sugar pellets and more exciting lights/sounds) but the probability of a reward is much lower than in the optimal options. When we administered microdoses of psilocybin, we found that the rats had an increased preference for the optimal options, and decreased preference for the risky options compared to their vehicle control. This suggests psilocybin microdoses may attenuate risky decision-making. Translationally, these results pave the way for a microdosing control trial in humans with or at risk for gambling disorders (like individuals with Parkinson's disease receiving L-Dopa treatment).



ELENA GREENALL

FROM NURC, WHAT DID YOU LEARN OUTSIDE OF PRESENTING?

Being at NURC helped to reinforce the importance of networking. Throughout the day I was able to connect with other undergraduate and graduate students with a variety of different interests. It was exciting to learn about the research other people are involved in and learn about new perspectives. I appreciated being able to talk to experienced graduate students, while also giving other undergraduates my advice about getting involved in research.

WHY WOULD YOU TELL OTHER STUDENTS TO ALSO GET INVOLVED AND PRESENT AT NURC?

Gaining research experience is extremely valuable, but being able to communicate your results is just as important. NURC is a great opportunity to practise both oral and science communication. Since you get to present your research so many times in such a short time frame at a conference, you quickly get to learn what resonates with people, and what they are maybe not so interested in. At NURC, I had a variety of people visit my poster, and I adapted my presentation based on what their questions were and what topics from my poster they wanted to hear about. Being able to communicate science clearly is such a beneficial skill to practise and is a key reason I would tell other students to get involved at NURC.

WHY WOULD YOU TELL OTHER STUDENTS TO ALSO GET INVOLVED AND PRESENT AT NURC?

Yes, definitely! The whole day is so well organised and is filled with so many worthwhile experiences to take part in like networking, presenting and attending workshops.



A Neuroscience Student Talking: **UNIVERSITY JOURNEY**

Story of Michelle Lam

Written by: Michelle Lam, Edited by: Amanda Ding, Designed by: Betty Lin



MICHELLE'S VERY FIRST DREAM

If you asked me when I was in grade 12, I would have never thought of choosing Neuroscience as my major. Unlike a lot of my friends in Neuroscience, I want to be a physiotherapist after undergrad.

This is something I have always wanted to do since Grade 8: helping people restore their mobility, function, and quality of life.



You may think neuroscience has nothing to do with physiotherapy. I didn't fully understand neuroscience's interdisciplinary nature until I volunteered at a physiotherapy clinic called Neuromotion.

THE TURNING POINT

My first-hand experience helping patients with stroke, spinal cord injury and other neurological disorders further sparked my interest in learning how neuroplasticity impacts recovery and what we can do to better direct exercise rehabilitation strategies.



THE ACTIVE LIFESTYLE

Outside of school, I like having an active lifestyle. You can find me going to the gym, running and swimming. I was a competitive swimmer for over 10 years, so I always love to challenge myself. I did my first half marathon in May and got a 10k personal best time.

I find fitness helps me to be a better version of myself, physically and mentally. Whenever I meet my goals, I feel a sense of accomplishment and I always want to push my limits.





Ever since my first year, I have always joined clubs to meet new people and have a break between studies.

In my first year, I tried something new and joined the Musical Theatre Troupe. We performed A Chorus Line and I played the flute in the band.

“IT WAS AN EYE-OPENING EXPERIENCE TO SEE HOW A THEATRE PERFORMANCE COMES TOGETHER.”

This year, I joined UBC Intramurals and helped organize the Day of the Longboat, which is the largest voyageur canoe race in the world.

Even though I had to wake up at 3 A.M. to set up for the race, I have made a lot of memories with my team. The full-time staff pushed me to accomplish things I never thought I could.



I can't wait to be part of the other events such as Great Trek, Gladiator, Tri-Du and Storm the Wall.

I am also excited to see what the next two years in the neuroscience program will take me and I look forward to trying new experiences.

AN INTERVIEW WITH DR. DEBORAH GIASCHI

Debbie Giaschi is a professor in the Department of Ophthalmology and Visual Sciences, and runs the Visual Neuroscience Lab at the BC Children's Hospital Research Institute. For the neuroscience students that go into the behavioural and cognitive stream, you may get the chance to take PSYC 367 and/or 368, two of the classes she teaches on sensory systems and perceptual processing. Below are some insights into her journey in research and advice for aspiring undergraduate students.



As many undergraduates are still undecided on what they want to do, I'm curious if there was ever a lightbulb moment, whether that be a class or project that pushed you towards a career in research.

In Dr. Giaschi's case, it was a person that first sparked her interest in research. One of her professors who taught a 2nd year sensation and perception course at the University of Toronto first introduced her to this area of research. She ended up taking a summer seminar with them, and then doing her honour's thesis on visual word perception with them in her fourth year, cementing her interest in this area of research. It goes to show how influential a single person can be. For those interested in a career in teaching, one truly can make an impact on and influence the path of your students.

What do you think is a common misconception about a career in research?

"Often when I tell someone I'm a professor, their immediate response is, what do you teach?" Being a professor can involve a significant portion of teaching, but it involves much more than that. For Dr. Giaschi, her time is roughly split up into thirty percent teaching, thirty percent research, thirty percent administration and ten percent publication. This can vary depending on how long you've been at a university. More senior professors are assigned more administrative duties; junior professors are more focused on establishing their labs, publishing papers, etc. Administrative tasks can consist of many different things, but one of the responsibilities Dr. Giaschi takes on is coordinating the NSERC Undergraduate Student Research Awards in the Faculty of Medicine.

What is your favourite book?

Shadow of the Wind by Carlos Ruiz Zafón, and A Tale of Two Cities by Charles Dickens were two that immediately came to mind. Dr. Giaschi is an avid reader, reading a range of genres from literary classics to romance novels to non-fiction.

AN INTERVIEW WITH DR. DEBORAH GIASCHI

What important qualities differ between potential graduate students looking to join your lab and undergraduates looking to join your lab as research assistants?

To accept a graduate student, a PI has to be able to guarantee a minimum stipend for 2 years for a Masters degree and for 4 years for a PhD degree. This can be partially covered through teaching assistant positions and scholarships, but if the graduate student has neither then the PI has to pay the full stipend. This is a challenge as it leaves less money for research costs. Research experience, grades, and publications are important as these are the main factors in determining whether or not graduate students can win scholarships to help offset these costs. As an undergraduate, eagerness to learn, professionalism and the ability to work independently are key. You aren't expected to know how to do everything immediately, especially when it comes to coding, but you should be able to take the initiative to learn how to navigate potential roadblocks when you encounter them.

What were you like as an undergraduate student?

Dr. Giaschi studied and worked hard as an undergraduate, but did not get an A+ in every single class to get to where she is today. Grades are valuable but people sometimes underestimate the importance of everything else and put grades on a pedestal. Residence life at the University of Toronto is different from what we're familiar with at UBC, as it is split into colleges. You often were able to take your tutorials at your college so you didn't have to walk across this large downtown campus. These colleges were a tight knit community, each having their own pubs and various events throughout the week.

What do you enjoy most about your work?

Being able to work with young people is rewarding, whether that be through mentoring undergraduate research assistants, teaching classes, or working with kids here at BC Children's Hospital.



DR. TERESA LIU-AMBROSE



The Health and Adult Development Lab

Dr. Hoppmann is interested in seeing how social interaction and motivational processes impact health. In doing so, the lab hopes to promote learning and health-benefiting activities in adults specifically. One goal of the lab is to understand how social relationships, such as spouses, impact personal health in an individual's every life. The lab is currently seeking undergraduate volunteers!

DR. CHRISTIANE HOPPMANN



Aging, Mobility and Cognitive Health Lab

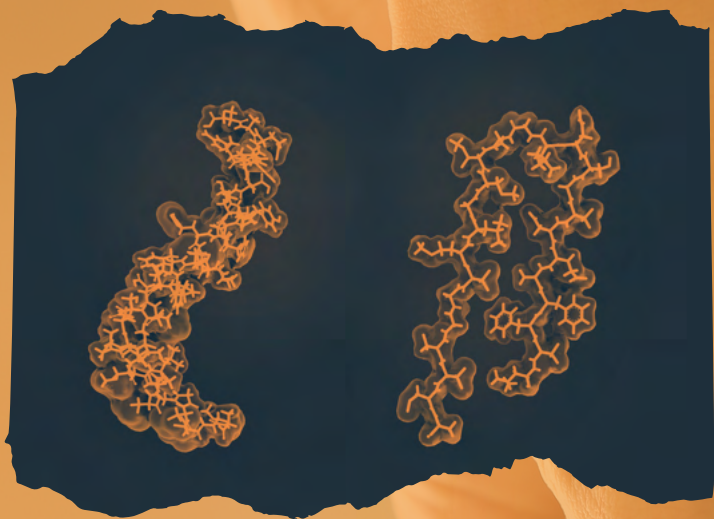
Dr. Liu-Ambrose's lab focuses on improving the health and quality of life for older adults through targeted exercise training and physical activity, with a particular interest in vulnerable populations such as people with cognitive impairment and dementia. Using cognitive neuroscience methods, her lab aims to optimize physical function, mobility, and functional independence.

NEUROSCIENCE LABS OF THE MONTH

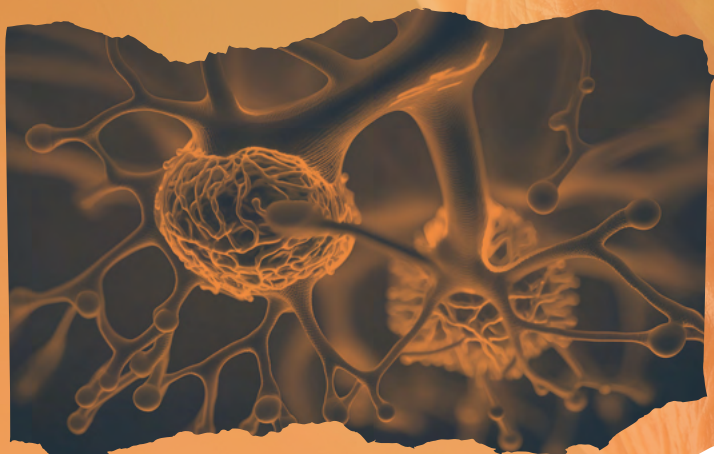


PODCASTS AND MEDIA

Check out this month's awesome Podcast and Media page that NSCI 302 students wrote last semester. This month, the focus is on Alzheimer's disease



Scientists believe this to be the cause of Alzheimer's disease, thus, preventing the disease requires preventing the build-up of amyloid-beta, which we can do through diet, sleep and exercise (TED, 2017). Genova also discusses the importance of cognitive reserve in preventing Alzheimer's, which involves the creation of new synapses which can offset the loss of synapses due to amyloid-beta plaques (TED, 2017).



The TED Talk What You Can Do to Prevent Alzheimer's discusses what scientists know about Alzheimer's thus far, and how we can prevent it. The TED Talk's speaker, Lisa Genova, explains the amyloid hypothesis of Alzheimer's disease, which involves the build-up of amyloid-beta in the synapse, causing inflammation, cellular damage, and phosphorylated tau within neurons (TED, 2017).



The discussion of neuroplasticity as a preventative measure for Alzheimer's relates to the topic of using neuroplasticity as a therapy and its potential avenues as a treatment for other brain disorders.



TED



Written by: Ainsley Needham

PODCASTS AND MEDIA

Check out this month's awesome Podcast and Media page that NSCI 302 students wrote last semester. This month, the focus is on Alzheimer's disease



In a TWiN podcast, neuroscientists have table-top conversations of a paper that links Alzheimer's Disease (AD) to a naturally-occurring protein, melanin-concentrating hormone (MCH).

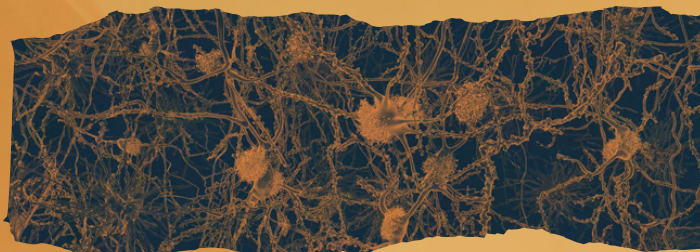


I think the podcast is a great resource that helps interpret the article by adding clarifications and context for complex concepts. They also raise their own questions, like reliability of AD mouse models and ramifications of oversaturating them with human genes. These casual conversations between scientists are great for getting a deeper insight and helping us understand the bigger picture!

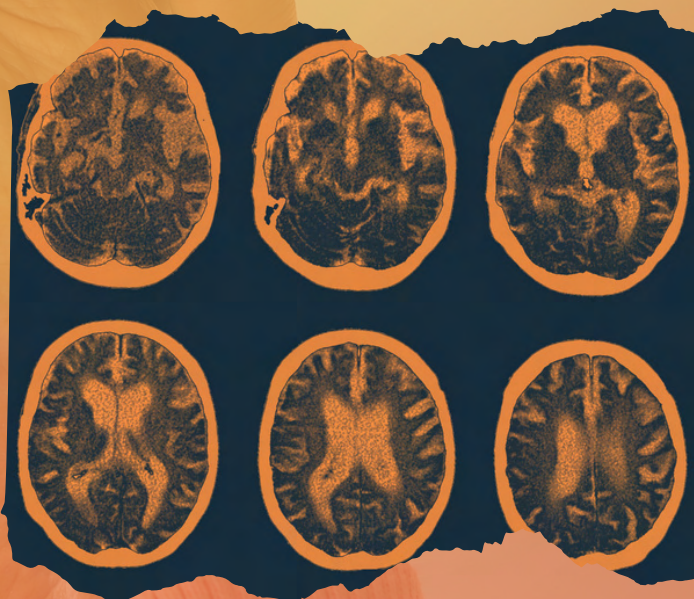
TWiN



Written by: Jannah Cruz



They discuss how MCH systems, known for role in sleep regulation, reduce neuronal hyperactivity, but are susceptible during the prodromal stage of AD. Dysfunction in MCH signaling and neuronal hyperactivity affect the progression of AD-related neurological challenges. The conversation touches on familiar AD concepts like amyloid beta, AD stages, and cortical compensation while introducing fresh insights such as hyperactivity in relation to sleeping, eating and memory.



EVENTS OF THE MONTH

JANUARY'S NEUROSCIENCE RESEARCH COLLOQUIUM

WALK FOR ALZHEIMER'S

Instagram: @walkforalzheimers_vancouver
When: May 26 @1PM

[WEBSITE FOR MORE INFO](#)

APRIL 5

APRIL 12

APRIL 19

MAY 3

Dr. Kaarina Kowalec, University of Manitoba: Depression polygenicity and its association with multiple sclerosis disease activity and progression

Dr. Carrie Ferrario, University of Chicago: Alterations in brain & behavior that contribute to obesity

Dr. Aki Taruno, Kyoto Prefectural University of Medicine: A chemical synapse that lacks vesicles

Dr. Edward Boyden, Massachusetts Institute of Technology: Tools for Analyzing and Repairing the Brain

APRIL 7

NEUROSCIENCE GALA

Time: 6:00-8:00PM
Location: AMS Nest Rooftop Garden
Fees: UNC Members FREE, General Admission \$5
Attire: Formal

Done midterms? Don't want to write your finals? Just want to dress up with friends and eat good food while watching the sunset? Come to the Neuroscience Gala! All under a beautiful rooftop garden with free member entry + food! Come celebrate the end of the semester with UBC Neuroscience Club, play some games and win some prizes! All disciplines are welcome to join. RSVP using the link in our bio NOW to secure a ticket!

[RSVP FORM](#)

APRIL 4

NEUROSCIENCE JOURNAL CLUB

Time: 6:00-7:30PM
Location: PONDEROSA 1003

This journal club will be hosted by Dr. Paul Pavlidis, a professor in the Department of Psychiatry. His lab investigates how our genes influence our behaviour, combining tools from both neuroscience and bioinformatics. If you are interested in learning about computational neuroscience, genetics, psychiatric disorders, and more, come join us for our last journal club of the year discussing a paper (shown below) with Dr. Pavlidis on April 4th. Free pizza and drinks will be provided!

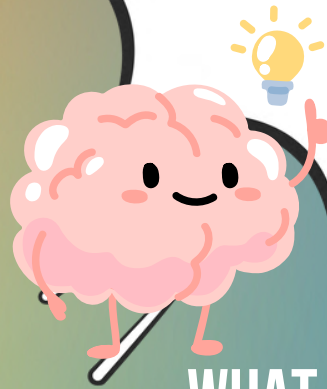
[RSVP FORM](#)

[PAPER LINK](#)

BABIES OF THE NEUROSCIENCE PROGRAM



Fill out next months polls **HERE!!**



WHAT IS YOUR FIRST CHILDHOOD MEMORY?

WHAT IS SOMETHING YOU WOULD TELL YOUR YOUNGER SELF?

You will find your people

Chill out

Play the piano so I don't have to learn it now

Go skateboard

you will be ok, it gets better!

Try not to be so shy

Don't stress so much about getting it right the first time. You live and you learn and it'll all work out.

You need to stop being so complacent. No matter how many times people tell you this, you've never listened because you tell yourself "they don't understand me as well as I do". Guess what? I do. Get off your high horse and start doing something you can actually be proud of.

Don't worry too much about how others perceive you

That I love her!!

WHAT IS YOUR FAVOURITE ARTIST FROM WHEN YOU WERE A KID THAT YOU STILL LISTEN TO?

- Traditional
- Taylor swift
- ABBA
- Bon jovi
- Taylor Swift
- One Direction
- Shawn Mendes
- i don't really remember but I remember listening to Kanye on the radio in the car
- Would listen to party in the USA on repeat
- Coldplay or Green Day

IF YOU COULD RE-LIVE ONE YEAR OF YOUR LIFE, WHAT AGE WOULD IT BE AND WHY?

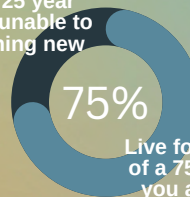
- **Age 5:** Because Kindergarten (very self-explanatory)
- **16**
- **5** would be a vibe - I miss not having any responsibility or taxes
- **2016** went on a family vacation that was very fun
- **5 years old.** Back when Christmas felt magical.
- **8 years old** so I can experience youth again
- **Age 8** - I went to Disneyland that year and I want to go again.
- **I think this year :)**
- **19**
- **5 years old,** everything was so fun and uncomplicated
- **2022.** When I was 18, I made a lot of questionable decisions after the quarantine era ended. If I could redo it, I would be more focused on my career and education path, avoid destroying important relationships, and focus on finding new things that make me happy rather than clinging to what I had.

WOULD YOU LIVE FOREVER IF YOU COULD?



WOULD YOU RATHER...

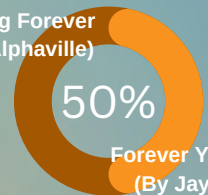
Live forever in the body of a 25 year old you but unable to learn anything new



Live forever in the body of a 75 year old you but you are able to learn new things

YOUNG FOREVER OR FOREVER YOUNG?

Young Forever (By Alphaville)



Forever Young (By Jay-Z)

Chasing my grandparents dog around my ottoman

Going to the zoo

My 3rd birthday party

Falling down the stairs

Going to the mail box near my house at four years old

Playing hide & seek: hiding behind our brown leather couch in the living room with brown wooden furniture and a green blanket while also looking out of the window. (according to my parents, this matches the description of my favourite childhood house that I cried about when sold & don't have any other memories of it).

Staring in the mirror and gaining awareness of consciousness LOL

Going to a hockey game with my family

I remember telling my family some dumb pirate joke when I was young. The joke wasn't even memorable but the way I felt that day was. It felt exhilarating and satisfying seeing my family smile and laugh around me. I think that memory seriously impacted me as I love to entertain and make people laugh to this day.

THANKS FOR READING!

Do you have any questions, feedback, or suggestions about the Neuroscience Newsletter or the Neuroscience Program? Want to be featured in the next Neuroscience Newsletter?

LET US KNOW IN THE
NEUROSCIENCE NEWSLETTER FEEDBACK FORM

RESOURCES:

WELLNESS RESOURCES

SEXUAL ASSAULT RESOURCES

EQUITY/HUMAN RIGHTS RESOURCES

THE NEUROSCIENCE RESEARCH BAY

OFFICE HOURS:

RYAN BOUMA

If you have any program-related questions, please direct them to Ryan, the program advisor at advising@neuro.ubc.ca

WRITTEN AND DESIGNED BY

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MEGAN HEW



FINN CARLSON



ADI SWARO



GET TO KNOW YOUR
NEUROSCIENCE PEERS!
fill out our
NEUROSCIENCE
STUDENT POLLS

References +
Study Material!