Why study behavioral neuroscience?

• To understand “normal” human behavior
Why study behavioral neuroscience?

- To improve human health
- Oxytocin and autism
- Diet, exercise and Alzheimer’s Disease
- SSRIs and depression
- More generally, **all** new drug candidates **must** succeed in animal trials before human clinical trials, without exception.
- For autism, Alzheimer’s disease, depression, schizophrenia, cancer, AIDS, diabetes, heart disease, etc.

http://www.youtube.com/watch?v=5ddlKQwDlle8
Why study behavioral neuroscience?

• Curiosity

• “basic” or “fundamental” research is a long-term investment, which can yield revolutionary advances and unexpected benefits!

http://www.goldengooseaward.org/
Neuroanatomy

biocytin
Neurochemistry

- Synaptic vesicle
- Voltage-gated Ca++ channels
- Post-synaptic density
- Neurotransmitters
- Neurotransmitter re-uptake pump
- Synaptic cleft
- Dendritic spine
- Axon terminal
- Neuronal activity

Additional diagrams and text not fully legible due to resolution limitations.
Neuroendocrinology
Development and aging
Circadian rhythms and sleep

DeMairan (1729)
Feeding behavior

NPY

Orexin
Reproductive behavior
Aggressive behavior

Group 1
Castration
Caponization

Group 2
Castration and reimplantation of testis
Normal male development

Group 3
Castration and transplantation of testis
Normal male development
Stress

- Postcaval vein
- Abdominal aorta
- Adrenal glands
- Kidneys

Control

Subordinate

[Image of a disaster scene with smoke and fire]

[Image of adrenal glands and blood vessels]
General learning outcomes

1. understand and apply some historical and foundational concepts and theories in behavioural neuroscience (including basic cellular, systems, and behavioural underpinnings).

2. demonstrate some conceptual understanding and procedural knowledge of behavioural neuroscience and neuroscience research design and techniques.

3. show a basic understanding of the neurobiological mechanisms and behavioural features of several neurological and psychiatric conditions.

4. propose and/or conduct a behavioural neuroscience experiment with animal subjects, including design, data collection, basic statistical analysis, and oral and written presentation.
General learning outcomes

5. read an introductory-level primary neuroscience-related article, understand its methods, summarize it, analyze its strengths, and recognize its limitations.

6. summarize a small behavioural neuroscience literature for both scientific and non-scientific audiences.

7. demonstrate written and oral communication skills in a variety of formats (i.e., scientific papers, review papers, newspaper and/or blog posts, and poster presentations) aimed at both neuroscientific and non-neuroscientific audiences.

8. identify some relevant career options, and ways to best prepare for them.
My specific course goals

• Understand how to study behavioral neuroscience
• Encourage critical and creative thinking
  • What is good about the study that was done?
  • What is wrong with (limitation of) the study?
  • What is not known?
  • What study/experiment should be done next?
• Improve oral and written communication
• Questions during lectures are highly encouraged!
  • I can’t emphasize this enough.
What would YOU like to learn about behavioral neuroscience ?!

• Discuss with a neighbor.
• Introduce yourself.
• On a piece of paper, write your neighbor’s name and one thing they want to learn and why.
• Share this information with the class.
• Pass the paper to me.
Instructors

• Dr. Kiran Soma
  • Office hour: after lecture, TTh 10:20 - 10:45 (CHEM D200)
  • or by appointment

• TAs: Nicole Jenni, Debra Bercovici, Alyssa Ash
  • Lab, Tues 5-8 or Thur 5-8 (CBH 3402A-C)
  • Do not arrive late! Doors will be locked.
  • Office hours: by appointment
  • See syllabus for email addresses

• **Email only to schedule in-person meetings**
Required textbook

- **12th Edition**
- UBC Bookstore or Amazon etc
- Hardcopy or PDF version OK

- Key Terms, Thought Questions, Quizzes
- References in back

- **Do the readings (see syllabus !)**
- Quick look before lecture, and then read thoroughly soon after lecture
Lectures

- TTh, 9:30 – 10:20 am *(50 min per day)*
- Lecture slides posted online (pdf), day before the lecture – *print and bring to lecture*
  
  - [www.psych.ubc.ca/~ksoma](http://www.psych.ubc.ca/~ksoma)

- **Slides will be missing critical information (will be on the exams), so attend all the lectures and actively participate in class.**

- **This is the most important way to succeed course !!**
Lectures

• During lectures, please *turn off* and *put away*
  • phones
  • laptops
  • tablets

• Do not arrive late.

• Please do not get ready to go before the lecture is finished.

• Actively participate in class.
Laboratory

- See lab syllabus and manual online.
- See information for 1\textsuperscript{st} lab session online.
Course evaluation

• See syllabus!

• Midterm 1: 20%
• Midterm 2: 20% (not cumulative)
• Laboratory: 25%
• Final: 35% (cumulative)
Course evaluation

• Exams will include multiple choice and short answer questions

• **Strong emphasis on critical thinking**
  • Analyzing experiments, interpreting data, and proposing new experiments

• **We will practice in class & you should also practice at home** (this is key)
Make-up exams

- Only for validated medical reasons
- Must email me within 1 day of the exam
- Submit documentation

- Make-up exams will be **oral exams** in the presence of instructor & a TA
Course grades

• Class average of 63-67%
• Standard deviation of 14

• Last year: average=65, SD=14
  • 80-100 (A) 20%
  • 68-79 (B) 36%
  • 55-67 (C) 21%
  • 50-54 (D) 15%
  • 0-49 (F) 8%

• Academic misconduct will be treated very seriously
Other resources for you

Djavad Mowafaghian Centre for Brain Health

Neuroscience Research Colloquia
Fridays, 11:00 - noon
Rudy North Lecture Theatre, Lower Level

http://www.brain.ubc.ca/
Other resources for you

- https://www.sfn.org/
- http://www.brainfacts.org/
What is science?

Just a way of trying to understand the natural world.

http://www.ted.com/talks/beau_lotto_amy_o_toole_science_is_for_everyone_kids_included.html
Scientific method

Observation

Question

Hypothesis

Prediction

Test: Experiment or additional observation

Supports hypothesis (make additional predictions and test)

Does not support hypothesis (revise or make a new one)

Pass many tests

Continue to test

Theory
What do YOU think might be a common myth about the brain?!

- Discuss with a different neighbor.
- Introduce yourself.
- On a piece of paper, write your neighbor’s name and one thing they think might be a common myth about the brain.
- What is one way to test this possible myth (hypothesis) using the scientific method?
- Think about correlational vs experimental approaches, control groups (if experimental)
- Share this information with the class.
- Pass the paper to me.