

COGS 1: Spring 2019

Section A, Week 2

Professor Boyle	mboyle@ucsd.edu	Friday, 2-4 pm	CSB 130
Lauren	lcurley@ucsd.edu	Tuesday, 10-11am	CSB 225
Lexi D.	adalenco@ucsd.edu	Tuesday, 12:30-1:45 pm	Sun God Lounge
Elena	edreisba@ucsd.edu	Thursday, 1-2 pm	CSB 114
Adrian	ajm033@ucsd.edu	Wednesday, 5-6 pm	CSB 114
Audrey	aberardi@ucsd.edu	Tuesday, 4-5 pm	CSB 114
Devansh	d4agarwa@ucsd.edu	Monday, 4-5 pm	CSB 114
Lori	rol044@ucsd.edu	Monday, 10-11 am	CSB 114
Lexi F.	adfrankl@ucsd.edu	Thursday, 4-5 pm	CSB 114

Announcement

CSSA PRESENTS



COGNITIVE CROSSROADS

NATIONAL COGNITIVE SCIENCE CONFERENCE 2019

APRIL 14, 2019 | 10AM-4:30PM | PC THEATER

CSSA proudly presents...



COGNITIVE CROSSROADS: National Cognitive Science Conference 2019

- Speakers from JHU and UCLA
- 6 Specialization Workshops
- 8+ Labs Open House
- Fantastic Networking Opportunity!



Register now @
bit.ly/NCSC_19



April 14, 2019
10AM - 4:30PM
PC Theater

Important Information

- Quizzes
 - Graded quizzes at the end of every section (~15mins)
 - Lowest quiz score will be dropped
- Midterms
 - Multiple choice and short answer
 - Midterm 1: scheduled for Tuesday week 5
 - Midterm 2: scheduled for Tuesday week 8
 - Midterm 3: scheduled for Thursday week 10
- Extra Credit
 - EC quizzes on readings on TritonEd (Start Week 3)
 - SONA - up to 4 EC units (4 units = 1% final grade)

Important Information (contd.)

- Section Procedure
 - I will present the list of review questions we can discuss. Because we might not have time to go over everything, we will take a vote to decide which material you want to go over the most. (~35mins)
- Piazza
 - <https://piazza.com/ucsd/spring2019/cogs1>
 - Ask questions (& answer others' questions)
 - Please make sure your questions are public (unless they are about a private matter)
 - Please make sure your questions haven't been answered before

A note about the quizzes:

Issues:

- Extra marks around bubbles
- No bubbling
- Bubbling too light
- No name

Write and circle
in your PID

Write down your name here

UC SAN DIEGO – DEPARTMENT OF COGNITIVE SCIENCE



STUDENT PID NUMBER									
A/U									
[0]	0	0	0	0	0	0	0	0	0
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[2]	2	2	2	2	2	2	2	2	2
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[9]	9	9	9	9	9	9	9	9	9

Last NAME First NAME							
COURSE NUMBER							
COGS 1							
SPRING 2019							
Dr. Mary ET Boyle							
Quiz A							
April 9-12, 2019							
Quiz VERSION							
A	B	C	D	E	F	G	H
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Section you are taking this quiz:
Please Bubble only one!

- [1] ① Monday @ 9 Lexi D.
- [2] ② Monday @ 4 Elena
- [3] ③ Wednesday @ 2 Adrian
- [4] ④ Wednesday @ 3 Audrey
- [5] ⑤ Wednesday @ 5 Devansh
- [6] ⑥ Friday @ 11 Lori
- [7] ⑦ Friday @ 12 Elena
- [8] ⑧ Friday @ 1 Lexi F.

Bubble in the
current section

Quiz will not be graded without
Academic Integrity Signature.

ACADEMIC INTEGRITY
By taking this quiz, you agree that you will follow ALL UCSD ACADEMIC INTEGRITY policies. It is YOUR responsibility to know and understand all of the policies. Failure to follow all UCSD Academic Integrity policies could result in expulsion from UCSD.
DO NOT DISCUSS THIS QUIZ CONTENTS WITH FELLOW STUDENTS!!!
_____ Signature
_____ Date
Your signature above certifies that you <i>will follow</i> and that you know that you will suffer the consequence for ANY academic integrity violation.

Sign and
date here



YOUR ANSWERS GO HERE

	[A]	[B]	[C]	[D]	[E]
1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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9	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Bubble in the
answers



Please do not do this!!

C. Shorter words are quicker

and easier to say

D. Both B and C

4. Which of the following languages does not have any known profanity equivalent?

A. Italian

B. Turkish

C. French

D. Japanese

5. True or False: Insulin is a hormone relevant only to blood sugar - it has nothing to do with brain.

A. TRUE

1

A

B

C

D

E

2

A

B

C

D

E

3

A

B

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10

A

B

C

D

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11

A

B

C

D

E

12

A

B

C

D

E

This person did not bubble in the quiz!

Score for quiz will be: 0

YOUR ANSWERS GO HERE

	[A]	[B]	[C]	[D]	[E]
1	(A)	(B)	(C)	(D)	(E)
2	(A)	(B)	(C)	(D)	(E)
3	(A)	(B)	(C)	(D)	(E)
4	(A)	(B)	(C)	(D)	(E)
5	(A)	(B)	(C)	(D)	(E)
6	(A)	(B)	(C)	(D)	(E)
7	(A)	(B)	(C)	(D)	(E)
8	(A)	(B)	(C)	(D)	(E)
9	(A)	(B)	(C)	(D)	(E)
10	(A)	(B)	(C)	(D)	(E)
11	(A)	(B)	(C)	(D)	(E)
12	(A)	(B)	(C)	(D)	(E)
13	(A)	(B)	(C)	(D)	(E)
14	(A)	(B)	(C)	(D)	(E)
15	(A)	(B)	(C)	(D)	(E)

This quiz is bubbled in **TOO LIGHT!**

The accuracy of grading this quiz is **LOW!**

SAN DIEGO – DEPARTMENT OF COGNITIVE SCIENCE

9 ① ② ③ ④ ⑤	Last NAME, First NAME	Section you are taking this quiz: Please Bubble only one! [1] ① Monday @ 3 Zoe [2] ● Monday @ 4 Lauren [3] ③ Monday @ 5 Alexis [4] ④ Monday @ 6 Kenny [5] ⑤ Friday @ 9 Sandhya [6] ⑥ Friday @ 10 Arturo
	COURSE NUMBER	
	COGS 1	
	WINTER 2018	
	Dr. Mary ET Boyle	
	Quiz A	
	Oct 8 – Oct 12 2018	

No name = ACADEMIC INTEGRITY VIOLATION!
No name = 0 for quiz score

Last Week's Topics

- **Lecture 1 | Dr. Boyle: An Introduction to Cognitive Science**
- **Lecture 2 | Dr. Boyle: Sleep and Circadian Rhythm**

Lecture 1

An Introduction to Cognitive Science,
Dr. Boyle

Vote!!

Lecture 1 | Review Questions

1. What is Cognitive Science –
 - a. What are the main objectives of the field?
 - b. How are the disciplines related?
2. The ability to learn and understand language is an extremely complex process. Is there something intrinsic in the human brain that enables language or is it experience?
3. What does it mean to “read the mind?” What is BCI?
4. What was special about the robotic hand?
5. How does cognitive science differ from computer science, neuroscience, philosophy, psychology, and linguistics?

1a. What is Cognitive Science, and what are the main objectives of the field?

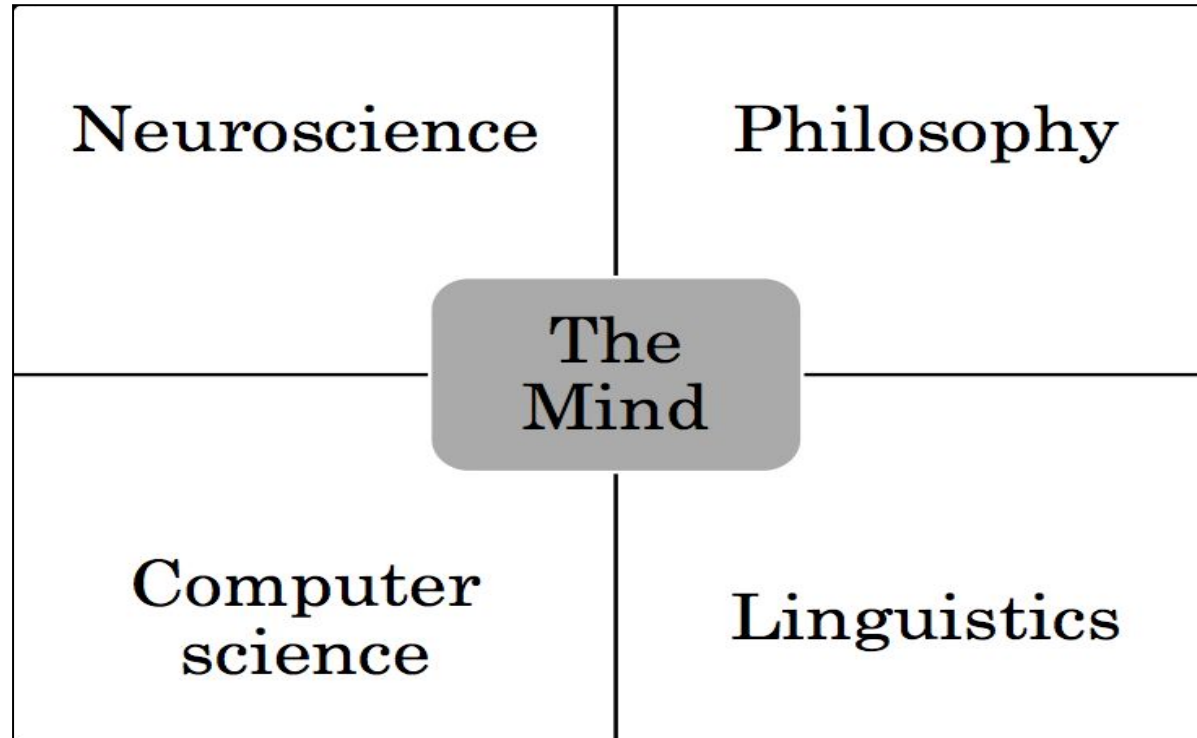
- Cognitive science is the **interdisciplinary scientific study** of the mind and its processes (e.g. emotion, language, reasoning, memory, perception)
- Cognitive science investigates **how information is *represented* and *transformed*** in terms of behaviour and thought



All Ques.



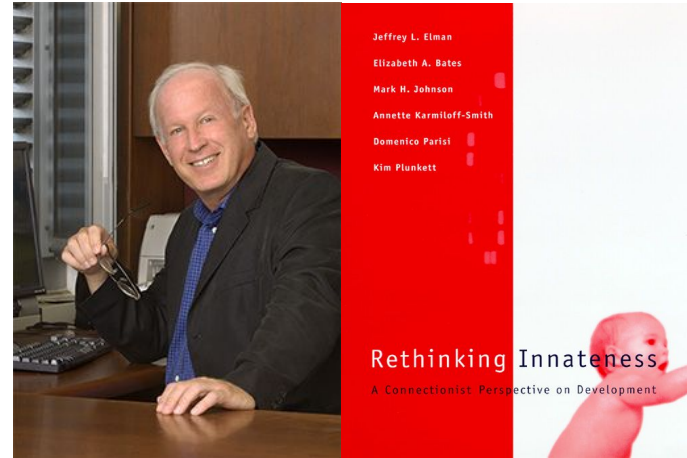
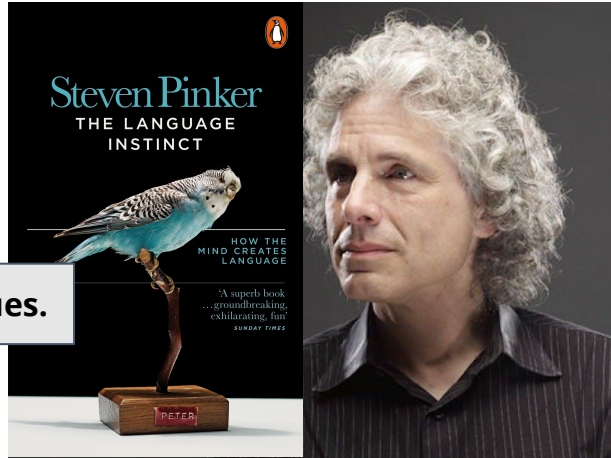
1b. CogSci subdisciplines & how they are related



2. Language: Nature vs. Nurture ?

Still in argument! Some main positions:

- Language is the way it is because of an innate ability - the language instinct (e.g. **Pinker**)
- Language is the way it is due to the general properties of human cognition (e.g. **Elman**)



All Ques.

3. “Reading Minds” | Brain Computer Interface

- Field of research that uses **sensors** to decode electrical activity of the brain, which the **computer** decodes in order to control an **external/implanted device**
- Example: Treatment of Parkinson’s Disease

<https://www.ucsd.tv/search-details.aspx?showID=21054>

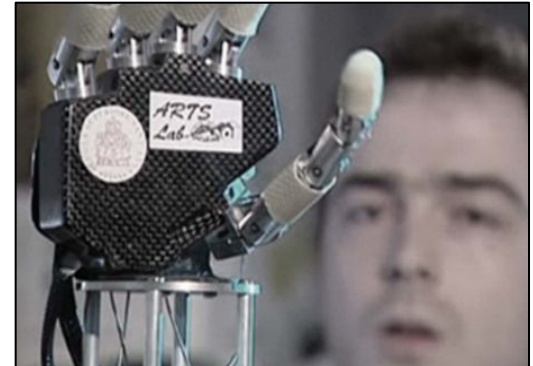
All Ques.



4. Robotic Hand

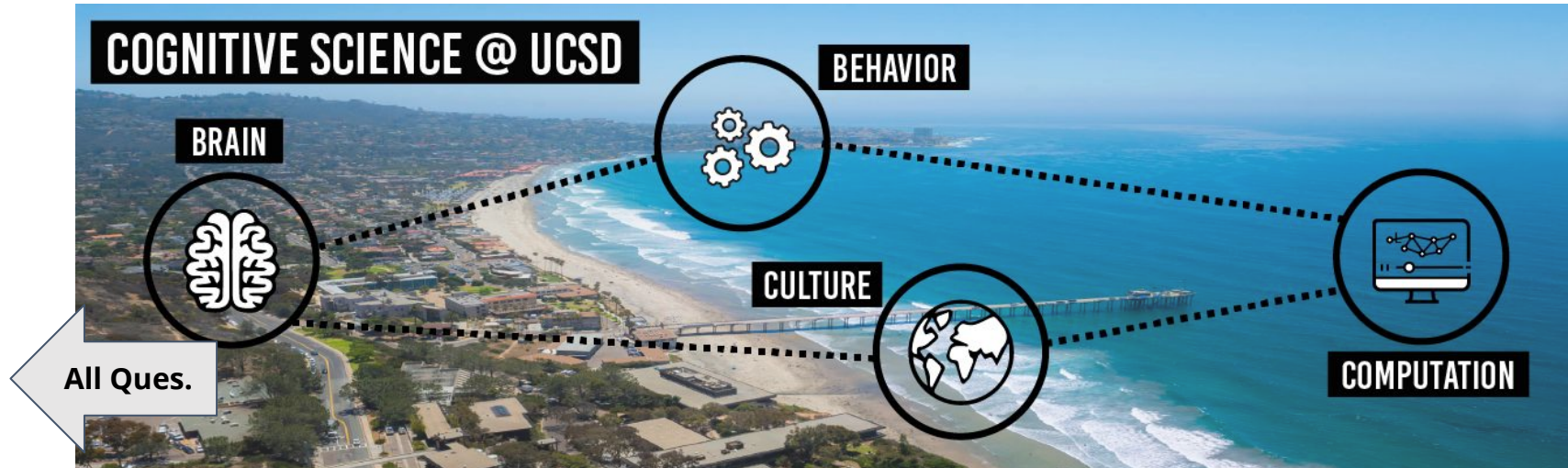
Patients' sense of touch was restored for the first time through the prosthetic

- The prosthetic stimulates nerves, producing texture, fragility feedback so hand applies appropriate pressure to grab objects.
- <http://www.livescience.com/43125-man-gets-first-bionic-hand-that-feels.html>



5. How does cognitive science differ from computer science, neuroscience, philosophy, psychology, and linguistics?

Cognitive Science incorporates aspects of all of these disciplines, as it is an *interdisciplinary field*



Lecture 2

Sleep and Circadian Rhythm,

Dr. Boyle

Lecture 2 | Review Questions (1 of 3)

Vote!!

1. [What are the consequences of sleep deprivation?](#)
2. [What is the role of melatonin and light in regulating circadian rhythms?](#)
3. [What is the SCN? What does it do?](#)
4. [How human circadian rhythms work?](#)
 - a. [What does it do?](#)
 - b. [What will happen when this rhythm is disrupted?](#)
5. [What are the other internal clock systems that we've talked about in the class?](#)

Lecture 2 | Review Questions (2 of 3)

Vote!!

6. [How is blood sugar regulated in our body?](#)
7. [Every cell has its own clock, for example, skin cell.](#)
 - a. [What is the clock of skin cells?](#)
 - b. [What does this tell us about the importance of circadian rhythms?](#)
8. [What factors are associated with our ability to go to sleep?](#)
9. [What is “social jet lag”?](#)
10. [What is so important about blue light?](#)

Lecture 2 | Review Questions (3 of 3)

Vote!!

11. What are the effects of chronic sleep deprivation? (REM sleep behavior disorder, sleep apnea, etc.)
12. What is sleep inertia?
13. What is the cognitive and physical performance of someone who has not slept in a 24 hour period?
14. What is sleep hygiene? Compare the effects of good and bad sleep hygiene. What are the components of good sleep hygiene?
15. Can sleeping aids overcome the effects of poor sleep hygiene? Why? Why not?

1. What are the consequences of sleep deprivation?

Short term sleep deprivation leads to:

- Cognitive and behavioral changes
- Decreased ability to concentrate
- Decreased short-term memory
- Paranoia and hallucinations

Long term sleep deprivation leads to:

- Cardiovascular stress (elevated heart rate and blood pressure)
- Disruption of the glymphatic system and thus build up of toxins
- Impaired executive functions
- Impaired emotional responses
- Impaired decision making



All Ques.

What are the consequences of sleep extension?

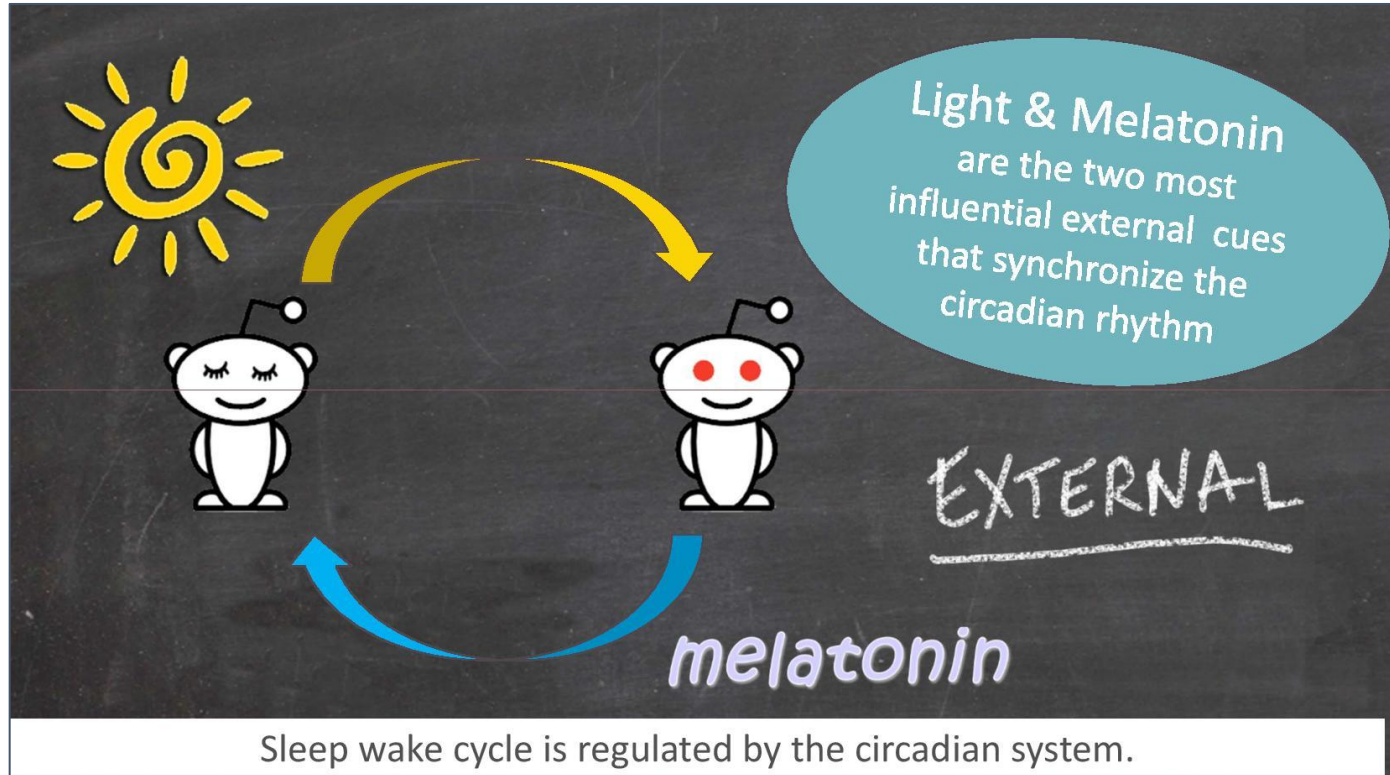
- **Stanford Basketball Study**

- Investigate effects of sleep extension over multiple weeks on specific measures of athletic performance as well as reaction time, mood, and daytime sleepiness
 - For 6 weeks, minimum of 10 hrs sleep/night
- Results:
 - More accurate shooting
 - Faster reaction time
 - Increased mental health
 - Increased physical well-being



All Ques.

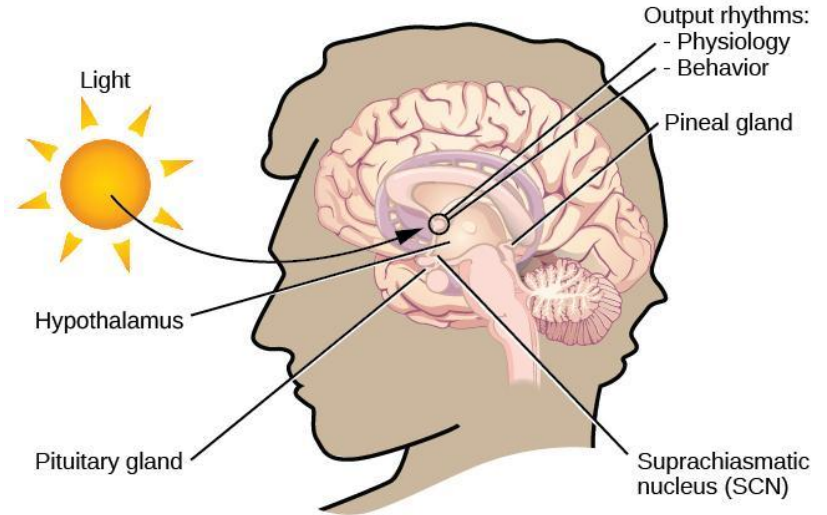
2. What are the roles of melatonin and light in regulating circadian rhythms?



All Ques.

3. What is the SCN? What does it do?

- The **suprachiasmatic nucleus (SCN)** is the tiny region of the brain in the *hypothalamus*.
 - The “master clock” of the brain used to **coordinate and synchronize** most of the body clocks in the periphery



All Ques.

4. How human circadian rhythm work? What does it do? What will happen when this rhythm is disrupted?

- One oscillation of circadian rhythm is on avg. **24 hours**.
- The brain synchronizes clocks in various cells of the body.
 - Genes direct the production of proteins at different times of day, which ramp up or inhibit biological processes.

If the sleep wake cycle is disrupted
it can cause **metabolic dysregulation**

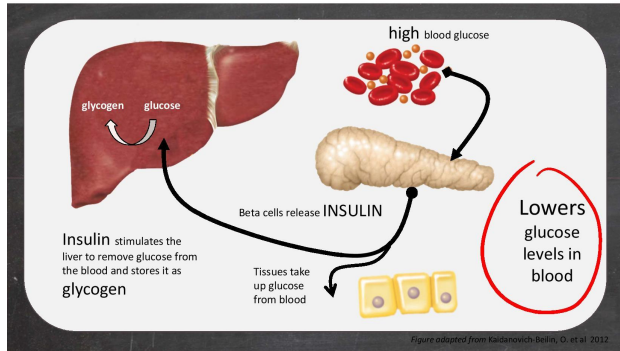
- Metabolic disruption
- Obesity
- Impaired immunity
- Cognitive malfunction



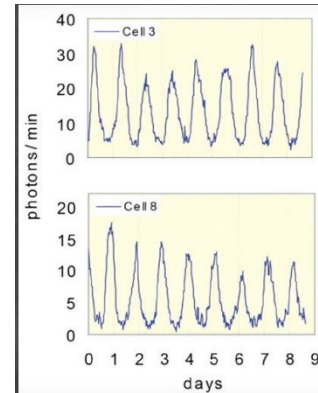
All Ques.

5. What are the other internal clock systems that we've talked about in the class?

- Pancreas

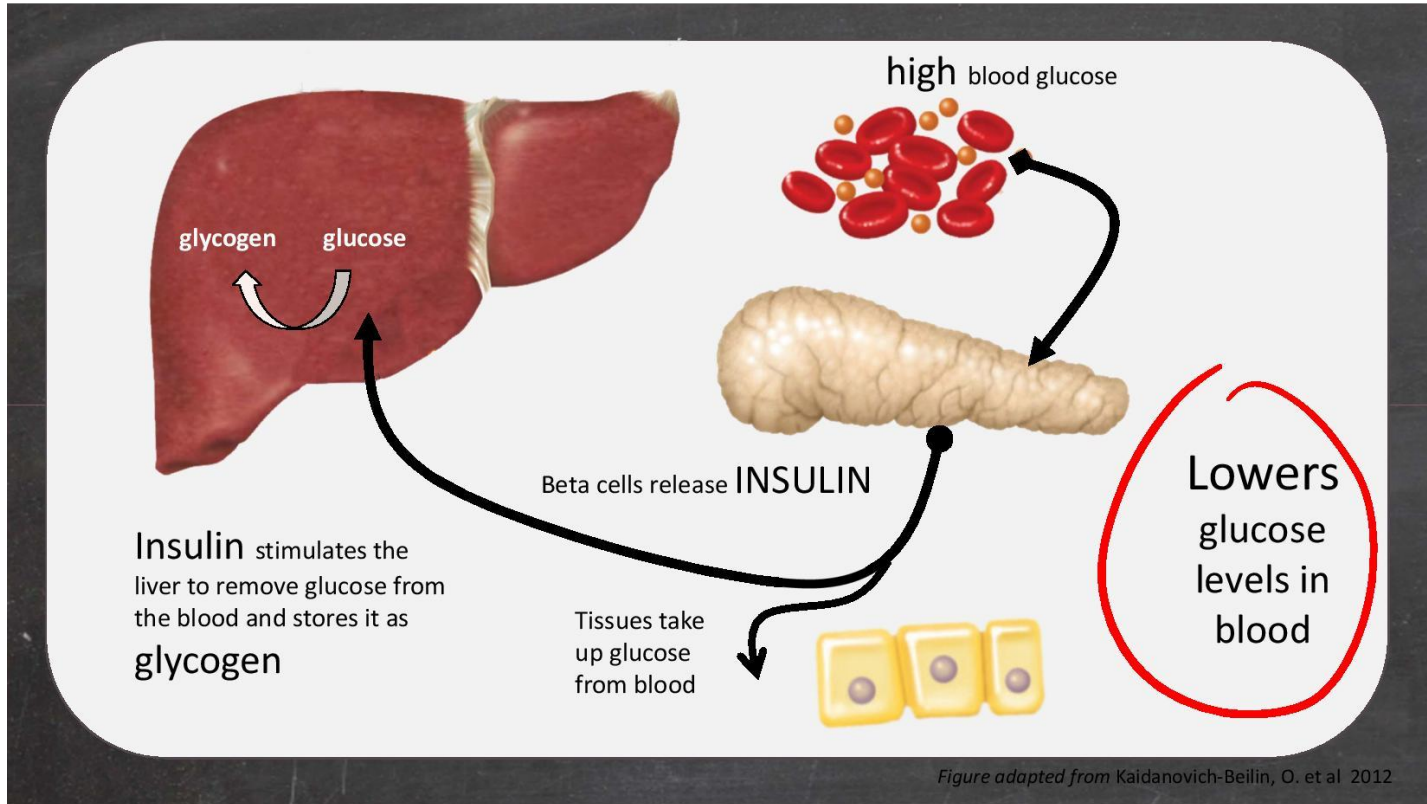


- Skin Cells

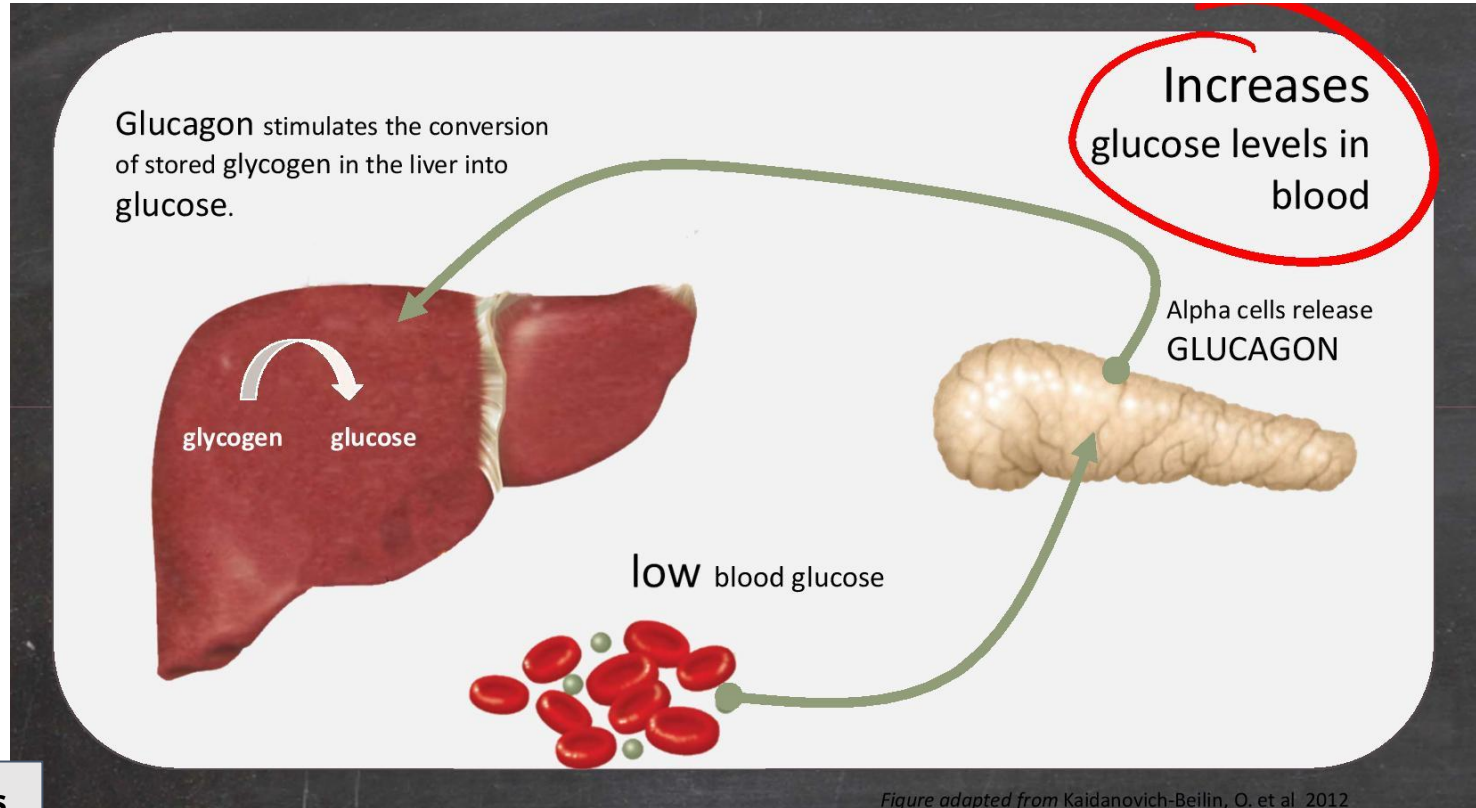


All Ques.

6. How is blood sugar regulated in our body?



6. How is blood sugar regulated in our body? (contd.)



All Ques.


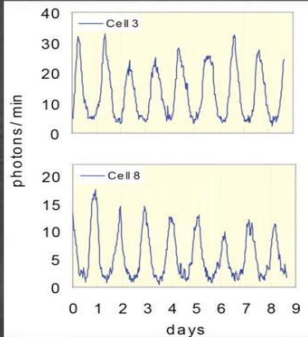
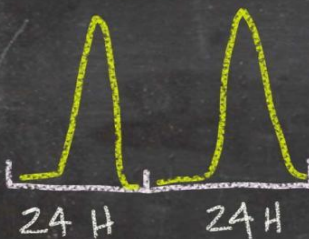

Figure adapted from Kaidanovich-Beilin, O. et al. 2012

7. Every cell has its own clock, for example, skin cell. What is the clock of skin cells?

Every cell has its own clock!

SKIN CELLS

24 HOURS



photons/min

days

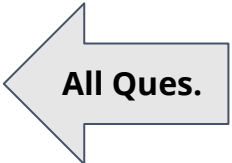
video recorded for 42 days!

All Ques.

data from: David Welsh; Video: J. Takahashi (2013) <https://www.youtube.com/watch?v=ocqn3wYTCRM#>

8. What factors are associated with our ability to go to sleep?

- Previous activities such as food and alcohol consumption
- Genetic components
- Environmental lights
 - Photoreceptors regulate our circadian rhythms
 - Blue light delays melatonin release
- The time we go to sleep



All Ques.

9. What is a “social jet lag”?

- Social jet lag is a result of circadian disruption
 - Exacerbated by drastic difference in wake times throughout the week
- Effects of circadian disruption on students
 - Affected executive function and emotional responses, decision making, mental health, and may be linked to rise of ADHD diagnoses
 - Schools with healthier start times saw increases in attendance, test scores, GPAs, and health

10. What is so important about blue light?

- Short-wavelength light AKA blue light is interpreted by our circadian systems as daylight.
- Blue light is emitted by televisions, computers, phones, etc.
 - Postpones the signal to brain to go to sleep
 - Subsequently affects the release of melatonin



11. What are the effects of chronic sleep deprivation? (REM sleep behavior disorder, sleep apnea, etc.)

REM-sleep behavior disorder

- Paralysis during REM sleep does not occur → dreams are acted out
- Increased risk for neurodegenerative diseases

Sleep apnea

- Breathing pauses for seconds to minutes during sleep → body briefly jolts to continue breathing
- Cognitive impairments
- Increased risk for diabetes, cardiovascular diseases

12. What is sleep inertia?

- Sleep inertia refers to a general feeling of grogginess immediately after sleep
 - Can be prevented by good sleep hygiene
 - Typically dissipates quickly when fully rested, but can last throughout day when without sleep

13. What is the cognitive and physical performance of someone who has not slept in a 24 hour period?

- The physical performance someone who has not slept in 24 hours is similar to that of someone with a BAC of 0.1%.
- **Short term effects:**
 - Decreased perception and motor skills
 - Emotional control
 - Learning, memory, simple arithmetic and reasoning tasks
- **Long term effects:**
 - More prone to metabolic and endocrine problems
 - Increased risk of diabetes
 - Decreased immune function
 - Increased risk of cancer
 - Increased risk of dementia

14. What is sleep hygiene?

Five things that stop a good night's sleep



15. Can sleeping aids overcome the effects of poor sleep hygiene?

- Existing sleeping aids may not be enough to counteract effects of overstimulation
- Sleep from medicine may not be as effective as regular sleep
- Risk of *parasomnia* -- behaviors like eating/leaving the house while asleep with no memory of it

Quiz Time!

- No talking, signaling, or communicating of any kind.
- Put away your books, notes, computers, phones, etc.
- Pen or pencil is okay (just make sure it's a black pen and you press hard with a pencil).
- Write your name in the "Name" box, write and circle in your PID, and sign the academic integrity agreement.
- Bubble in this section
- Please have your student ID out when you turn in your quiz!

Write and circle
in your PID

Write down your name here

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STUDENT PID NUMBER									
A/U									
[0]	0	0	0	0	0	0	0	0	0
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Bubble in the
answers