

Neuroscience 26 INTRODUCTION TO NEUROSCIENCE Spring 2011

Profs. John-Paul Baird and Stephen George

Course Outline and Readings

Date	Prof	Lab	Topic	Reading
			<i>Introduction; Development of the nervous system</i>	
Jan.24	JPB/ SG	Histology	Introduction to neuroscience	Chapter 1
26	SG		Neurogenesis, migration	Chapter 7 (178-195); 23 (690-8)
28			Axon pathfinding; cell death	Chapter 23 (698-708)
31		Electrophysiology I	Role of neural activity in development Hua JY, Smear MC, Baier H, Smith SJ. Regulation of axon growth <i>in vivo</i> by activity-based competition. <i>Nature</i> <u>434</u> (2005) 1022-1026	
			<i>Electrical signaling</i>	
Feb. 2			Membrane potentials	Chapter 3
4			Action potential	Chapter 4
7		Electrophysiology II	Conductance mechanisms Stringer JL. Regulation of extracellular potassium in the developing hippocampus. <i>Developmental Brain Research</i> <u>110</u> (1998) 97-103.	
9	JPB		Outline of neuroanatomy	Chap. 7 (168-180; 193-199; 205-216; 227-235); Chap. 15 (490-498)
			<i>Synaptic transmission</i>	
11	SG		Chemical transmission	Chapter 5 (102-122)
14		Neuroanatomy I	Postsynaptic potentials	Chapter 5 (122-131)
16			Neural integration Lin C, Sim S, Ainsworth A, Okada M, Kelsch W, Lois C . Genetically Increased cell-intrinsic excitability enhances neuronal integration into adult brain circuits. <i>Neuron</i> <u>65</u> (2010) 32-39.	
17/18			<i>Exam 1</i>	
21	JPB	Neuroanatomy II	Neurotransmitter systems	Chapter 6; Chapter 15 (498-507)
23			Quarta D, Valerio E, Hutcheson DM, Hedou G, Heidbreder C. The orexin-1 receptor antagonist SB-334867 reduces amphetamine-evoked dopamine outflow in the shell of the nucleus accumbens and decreases the expression of amphetamine sensitization. <i>Neurochemistry International</i> <u>56(1)</u> (2010) 11-5.	
25			Pilotte NS, Sharpe LG, Kuhar MJ. Withdrawal of repeated intravenous infusions of cocaine persistently reduces binding to dopamine transporters in the nucleus accumbens of Lewis rats. <i>J. Pharmacology and Experimental Therapeutics</i> <u>269</u> (1994) 963-9.	

			<i>Sensorimotor systems</i>	
28	JPB	Neuroanatomy III	Chemoreception	Chapter 8 (252-264) Zhao GQ, Zhang Y, Hoon MA, Chandrashekar J, Erlenbach I, Ryba NJ, Zuker CS. The receptors for mammalian sweet and umami taste. <i>Cell</i> <u>115</u> (2003) 255-66.
Mar. 2			Auditory system I	Chapter 11 (344-375)
4			Auditory system II	Macias, S, Mora EC, Kossi, M, Abel, C, Foeller, E. The auditory cortex of the bat <i>Molossus molossus</i> : Disproportionate search call frequency representation. <i>Hearing Research</i> <u>250</u> (2009) 19-26.
7		Lab Practical	Motor systems: spinal	Chapter 13
9			Motor systems: brain	Chapter 14 Cohen AD, Tillerson JL, Smith AD, Schallert T, Zigmond MJ. Neuroprotective effects of prior limb use in 6-hydroxydopamine-treated rats: possible role of GDNF. <i>J Neurochem.</i> <u>85(2)</u> (2003) 299-305.
			Visual system: retina	Chapter 9 (288-306)
11	SG			
Spring break				
21	SG	Surgery demo	Visual information processing	Chapter 10 (310-329)
23			Visual cortex functions	Chapter 10 (330-341) Ferster D, Chung S, Wheat H. Orientation selectivity of thalamic input to simple cells of cat visual cortex. <i>Nature</i> <u>380</u> (1996) 249-52.
			24/25	Exam 2
28		6OHDA lesions	Visual system plasticity	Chapter 23 (708-716)
30			Somatosensory system	Chapter 12 (388-408)
Apr.1			Pain	Chapter 12 (408-421) Eisenberger NI, Lieberman MD, Williams KD. Does rejection hurt? An fMRI study of social exclusion. <i>Science</i> <u>302</u> (2003) 290-292.
Motivation / Endocrine systems/ Memory				
4	JPB	Behavior/ cfos	Feeding behavior I	Chapter 16 (510-522)
6			Feeding behavior II	Chapter 16 (522-531)
8			Endocrine systems	Chapter 15 (482-490)
11	ST*	HPLC	Stress	Chapter 15 (491-496); 18(573-582); 22 (668-670)
13			Sexual behavior	Chapter 17 (541-561)
15		SG	Human and animal memory	Chapter 24
18			Neural plasticity: mechanisms	Chap. 23 (716-722); Chap. 25
20	Data discussion		Does LTP underlie human and animal memory? Rogan MT, Stäubli U, Ledoux JE. Fear conditioning induces associative long-term potentiation in the amygdala. <i>Nature</i> <u>390</u> (1997) 604-607.	
	21/22	Exam 3		

25	JPB	No lab	Brain mechanisms of reward & addiction Chapter 16 (522-27) Reynolds, SM and Berridge KC. Positive and Negative Motivation in Nucleus Accumbens Shell: Bivalent Rostrocaudal Gradients for GABA-Elicited Eating, Taste Liking" / "Disliking" Reactions, Place Preference/Avoidance, and Fear." <i>J. Neuroscience</i> <u>22(16)</u> (2002): 7308-7320.	
27			Reward & addiction II Fiorillo, CD, Tobler PN, and Schultz W. "Discrete Coding of Reward Probability and Uncertainty by Dopamine Neurons." <i>Science</i> <u>299(5614)</u> (2003): 1898-1902.	
			<i>Diseases of the nervous system</i>	
29			Depression Chapter 22 (673-678) Mague SD <i>et al.</i> Antidepressant-like effects of kappa-opioid receptor antagonists in the forced swim test in rats. <i>J. Pharmacology and Experimental Therapeutics</i> <u>305</u> (2003) 323-330.	
May 2			Angiotensin : thirst	Schizophrenia
4	SG	Neurodegenerative diseases		
6		Alzheimer disease		Box 2.3 p. 36-37
Pick up May 6 - 10		Final Exam: 3-day take-home		

*Guest lecturer, April 13: Prof. Sarah Turgeon