Chem 697

Cellular Signaling

Week	Topic	Reading
1-2	I) Introduction to Signaling ▪ Parameters inherent to any signaling network (type of signal carrier, agonist/antagonist, information flow) ▪ Protein Switches as nanoprocessors (structure/function, coupling types, allostery) ▪ Energetics (information, order, energy extraction, non covalent interactions) ▪ Kinetics (Michaelis-Menton, Scatchard, Hill)	Chpts 1-3
3-5	II) GTP-dependent Nanoprocessing ▪ Structure function consequences of GTP hydrolysis (Gαβγ, Ras) ▪ Kinetics of GTP hydrolysis and allostery ▪ Upstream interactions (Gprotein coupled receptors) ▪ Downstream interactions ▪ Vision and sensory processing ➢ Pharmacology, experimental approaches, pathways, interaction domains	Chpts 4-6 *Chpts 23, 24*
6	III) Second Messengers ▪ cAMP and adenylate cyclases ▪ Ca2+ and Calcium channels	Chpts 7, 8
7-8	IV) Serine/Threonine-phosphorylation-dependent Nanoprocessing ▪ Ser/Thr kinases (structure/function of activation and allostery, PKA, PKC, MAPK, kinetics of phosphorylation) ▪ Phosphatases and Protein Dephosphorylation ➢ Pharmacology, experimental approaches, pathways, interaction domains	Chpts 9, 19-21 *Chpts 23, 24*
9-10	V) Tyrosine Phosphorylation-dependent Nanoprocessing ▪ Tyr-kinases (receptor and non receptor types) ▪ Growth factor Receptors and Adhesion Molecules ➢ Pharmacology, experimental approaches, pathways, interaction domains	Chpts 11-13 *Chpts 23, 24*
11-12	VI) Lipid-dependent Nanoprocessing ▪ Inositol phosphates and respective lipases and kinases ▪ Lipid messengers (arachidonic acid, ceramide, DAG) ▪ Insulin signaling and glucose/glycogen metabolism ➢ Pharmacology, experimental approaches, pathways, interaction domains	(Chpts 18) *Chpts 23, 24)*
13-14	V) Special Topics ▪ Cellular Differentiation	 (Chpt 14)

	▪ Innate immunity ▪ Inflammation ▪ Adaptive immunity ▪ Nuclear Receptors	(Chpt 15) (Chpt 16) (Chpt 17) (Chpt 10)
15	***Final Exams***	

[Schedule based on a 15 week semester]