



دانشگاه کردستان

طرح کلی درس زیست‌شناسی سلولی و مولکولی ۱ (نیمسال دوم ۱۳۹۸ - ۱۳۹۹)

شماره درس: ۳۰۲۰۲۸۷-۰۱

مقطع تحصیلی: کارشناسی

تعداد واحد: ۳

امتحان میان ترم	فعالیت کلاسی و تمرین‌ها	حضور در کلاس	نمره تشویقی (مشارکت در پرسش و پاسخ کلاسی، طرح مسائل جدید مرتبط با درس)	امتحان پایان ترم
نمره ۵	نمره ۶	نمره ۴	نمره ۲	نمره ۵

استاد درس: فرنوش خسروبخش

آدرس گروه تلگرامی درس: https://t.me/joinchat/F9qeuVJ7nn9IA_4_Bh2Gcw

راه ارتباطی و ارسال حل تمرین‌ها: f.khosrobakhsh@uok.ac.ir , f_khsh@yahoo.com

منبع اصلی درس:

Molecular Biology of the cell, Sixth Edition, Bruce Alberts, 2016, Garland Science, Taylor and Francis group, Abingdon, UK.

سرفصل های درس

عنوان فصل	مطالب تدریس شده
<p>1. Membrane Structure</p>	<p>Lipid Bilayer:</p> <ul style="list-style-type: none"> • Major Lipids in Cell Membranes • Phospholipids Spontaneously Form Bilayers • The Lipid Bilayer Is a Two-dimensional Fluid • Fluidity of a Lipid Bilayer • Lipid Rafts • Lipid Droplets • Asymmetry of the Lipid Bilayer • Glycolipids <p>Membrane Proteins:</p> <ul style="list-style-type: none"> • Association of Membrane Proteins with the Lipid Bilayer • Some Membrane Proteins Acquire a Covalently Attached Glycosylphosphatidylinositol (GPI) Anchor • Membrane Localization of Some Signaling Proteins with Lipid Anchors • Large Channels of β Barrels • Glycosylated Membrane Proteins • Solubilisation and Purification of Membrane Proteins with Detergents • Bacteriorhodopsin :Light-driven Proton (H^+) Pump That Traverses the Lipid Bilayer as Seven α Helices • Methods for analysing diffusion of Membrane Proteins in the Plane of the Membrane • Specific Domains of Proteins and Lipids Within a Membrane • Cortical Cytoskeleton
<p>2. Intracellular Compartments and Protein Sorting</p>	<p>The Compartmentalization of Cells:</p> <ul style="list-style-type: none"> • Different Ways for Movement of Proteins Between intracellular Compartments • Signal Sequences and Sorting Receptors Direct Proteins to the Correct Cell Address <p>Gated Transport (The Transport of Molecules Between the Nucleus and the Cytosol):</p> <ul style="list-style-type: none"> • Nuclear Pore Complexes Perforate the Nuclear Envelope • Nuclear Localization Signals Direct Nuclear Proteins to the Nucleus • Nuclear Import Receptors Bind to Both Nuclear Localization Signals and NPC Proteins • Nuclear Export • The Ran GTPase Imposes Directionality on Transport Through NPCs • Transport Through NPCs Can Be Regulated by Controlling Access to the Transport Machinery • The control of nuclear import during T cell activation • Feedback regulation of cholesterol biosynthesis • Transport of a large mRNA molecule through the nuclear pore complex <p>Peroxisomes:</p> <ul style="list-style-type: none"> • Oxidation Reactions in Peroxisomes

	<ul style="list-style-type: none"> • Import of Proteins into Peroxisomes <p>The Endoplasmic Reticulum:</p> <ul style="list-style-type: none"> • The ER Is Structurally and Functionally Diverse • A Signal-Recognition Particle (SRP) Directs the ER Signal Sequence to a Specific Receptor in the Rough ER Membrane • Translocation Across the ER Membrane • Combinations of Start-Transfer and Stop-Transfer Signals Determine the Topology of Multipass Transmembrane Proteins • Glycosylating Proteins Synthesized in the Rough ER by the Addition of a Common <i>N</i>-Linked Oligosaccharide • Oligosaccharides: Tags to Mark the State of Protein Folding • Improperly Folded Proteins Are Exported from the ER and Degraded in the Cytosol • Unfolded Protein Response (UPR) • The ER Assembles Most Lipid Bilayers
<p>3. Intracellular Vesicular Traffic</p>	<p>The Molecular Mechanisms of Membrane Transport and the Maintenance of Compartmental Diversity:</p> <ul style="list-style-type: none"> • There Are Various Types of Coated Vesicles • The Assembly of a Clathrin Coat Drives Vesicle Formation • Adaptor Proteins Select Cargo into Clathrin-Coated Vesicles • Phosphoinositides Mark Organelles and Membrane Domains • Cytoplasmic Proteins Regulate the Pinching-Off and Uncoating of Coated Vesicles • Rab Proteins Guide Transport Vesicles to Their Target Membrane • SNAREs Mediate Membrane Fusion <p>Transport from the ER Through the Golgi Apparatus:</p> <ul style="list-style-type: none"> • The Golgi Apparatus Consists of an Ordered Series of Compartments • Oligosaccharide Chains Are Processed in the Golgi Apparatus • Proteoglycans Are Assembled in the Golgi Apparatus <p>Transport from the <i>Trans</i> Golgi Network to Lysosomes:</p> <ul style="list-style-type: none"> • Lysosomes Are the Principal Sites of Intracellular Digestion • Lysosomes Are Heterogeneous • Plant and Fungal Vacuoles Are Remarkably Versatile Lysosomes • Multiple Pathways Deliver Materials to Lysosomes • Autophagy Degrades Unwanted Proteins and Organelles • A Mannose 6-Phosphate Receptor Sorts Lysosomal Hydrolases in the <i>Trans</i> Golgi Network • Defects in the GlcNAc Phosphotransferase Cause a Lysosomal Storage Disease in Humans • Some Lysosomes and Multivesicular Bodies Undergo Exocytosis <p>Transport into the Cell from the Plasma Membrane (Endocytosis):</p> <ul style="list-style-type: none"> • Pinocytic Vesicles Form from Coated Pits in the Plasma Membrane

	<ul style="list-style-type: none">• Cells Use Receptor-Mediated Endocytosis to Import Selected Extracellular Macromolecules• Specific Proteins Are Retrieved from Early Endosomes and Returned to the Plasma Membrane• Early Endosomes Mature into Late Endosomes• Specialized Phagocytic Cells Can Ingest Large Particles <p>Transport from the <i>Trans</i> Golgi Network to the Cell Exterior (Exocytosis):</p> <ul style="list-style-type: none">• Many Proteins and Lipids Are Carried Automatically from the <i>Trans</i> Golgi Network (TGN) to the Cell Surface
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تذکر چند نکته مهم:

۱. هر گونه پرسش در باره درس را از طریق ایمیل بالا می توانید مطرح کنید.
۲. پاسخ تمرین ها را از طریق ایمیل تا زمانی که فرصت داده شده بفرستید.
۳. توضیح پاسخ تمرین هایی که ارسال کرده اید در کلاس مجازی از شما خواهیم پرسید بنابراین آمادگی کافی داشته باشید.