Biol Journal. Biol 1A This assessment has two parts to be completed. art 1. Complete the answers to 10 questions per chapter in the study guide for in the list below after Part 2 (See study guide questions at the end of the page) Answers should be complete and succinct, 2 or 3 sentences long. I know this could feel initially like a lot of work. Most lectures materials are based on this textbook: Campbell Biology, By: Reece et al, 11th ed. Pearson Publishing Company. ISBN-13: 9780134093413 Optional: if you want to make your own drawings in addition to the written answers, that may help you learn the concepts better. You can do comparison or summary tables as well. Part 2. Create 2 questions for each one of the six sections in Part1 and provide complete answers for them. Different from the study guide of course. Here it is your opportunity to create your own questions and show your ability to learn on your own and be curious. Part 1 Questions to choose from: Gene expression (protein synthesis) (ch 17) Make sure to choose 5 questions that involve transcription and translation What is the general route of information flow in the cell (central dogma); what is our current notion of a gene and what are possible gene products? Distinguish between transcription and translation Describe where transcription and translation occur in prokaryotes and eukaryotes; differences between prokaryotes and eukaryotes Define codon, and explain the relationship between codons on mRNA and the linear sequence of amino acids in a polypeptide What is meant by start and stop codons; what do they do? Why is code said to be redundant? unambiguous? universal? Describe the process of transcription; role of RNA polymerase, promoter, terminator (in prokaryotes) In what direction is mRNA transcribed? In what way is the primary mRNA transcript modified before it leaves the nucleus? What is meant by pre-mRNA? RNA processing? Alternative RNA splicing, how does it help to increase the diversity of proteins that we produce? Differentiate between an Intron and an Exon? Distinguish the functions of mRNA, tRNA, and rRNA. Other RNA molecules discussed (hint: spliceosome) Control of gene expression (ch. 18) answer all these questions. Do differentiated somatic cells all contain the same genetic information? Why organisms need to regulate gene expression? Consequences/importance for prokaryotes? Eukaryotes? What is an operon? Role of operon in controlling gene expression? What are the levels/stages at which gene expression is controlled in eukaryotes? Effect of acetylation and methylation on transcription. Describe which molecules are methylated or acetylated. What are transcription factors? Functions? Describe the post-transcriptional levels of gene regulation. Cancer and Immune system Cancer/cell division connection and causes. Role of proto-oncogenes and tumor suppressor genes in development of cancer Common types of cancer? Which are the most effective treatments? What are the two main parts of the immune system? Which types of white blood cells protect us from cancerous cells? Explain the ABO blood types. How do mRNA vaccines work? For how long scientists have worked on mRNA therapeutics? Explain a disease related to immune hypersensitivity. Explain a disease related to immune deficiency. Animal Form and function: Know 4 main types of animal tissues, examples and main function(s) of each Examples of simple vs. stratified epithelium, related to function? Examples of connective tissues in the vertebrate body What are the differences between the 3 types of muscle tissues? What is meant by the resting potential of a cell? Understand that action potentials of nerve and muscle cells involve the rapid depolarization of the plasma membrane as a result of ion movements (role of Na+) Three types of muscle tissue, where? Voluntary vs. involuntary? What systems are the main control systems of the body? How does signaling by hormones differ from that by nerves? What does “homeostasis” refer to? What are the characteristics of animals? Explain physiological changes that animals use to adjust their body temperatures? Nutrition and digestion: What does food provide? What is meant by an “essential nutrient?” Distinguish Malnutrition vs. undernutrition Intracellular vs. extracellular digestion; complete vs. incomplete digestive system; gastrovascular cavity (and example of animals) What are the organs (compartments) of mammalian alimentary canal; accessory organs of digestive system; sphincters How does vertebrate digestion works: Know what happens in mouth, stomach, small intestine, large intestine—mechanical and enzymatic digestion; which types of molecules Relation between gastric juice, HCl, pepsinogen, pepsin, chief cells, parietal cells. Example of positive feedback in production of pepsin Role of mucus in stomach? Produced by? What causes heartburn? What organism is associated with ulcers? Function and activities of: amylase, pancreatic enzymes (amylase, nucleases, proteases, lipases), pepsinogen, pepsin, bile What is secreted into the duodenum? (from pancreas/gall bladder/intestinal epithelium) Circulation and Gas Exchange: Compare and contrast open and closed circulatory systems, including examples given of animal taxa that have them What are some differences between mammalian blood and invertebrate hemolymph, interstitial fluid Vertebrate circulation: single vs. double circulation. What vertebrates have a 4-chambered heart? Advantage? Describe or draw the path of blood through all parts of the mammalian heart, and major arteries and veins near the heart in both systemic and pulmonary circuits (aorta, pulmonary arteries and veins, superior, inferior vena cava); where is blood oxygenated/deoxygenated (as for lab exam) Parts of the cardiac cycle; systole, diastole; relate to blood pressure Differences between arteries, veins, capillaries; where is flow rate lowest and why; relative blood pressure in each? What helps blood return to the heart in veins despite low pressure and gravity? How is “economy class syndrome” related? Describe or draw the Pathway of air from nose to alveoli (all parts) in mammal Role of alveolar surfactant and “negative” intra pleural pressure in maintaining expanded alveoli and lungs, respectively (see lab) Relation between diaphragm, rib muscles, thoracic cavity volume, intrapulmonary pressure, in breathing (see lab)