**Unit 7 Cells**

**Knowledge Audit**- follow How To Instructions on the main General Documents page

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Topic 1

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| **Objectives:**  Living organisms are composed of cells  Unicellular organisms carry out all functions of life  Cell Surface to volume is an important limitation to cell size  Multicellular organisms have properties that emerge due to the interaction of their cellular components  Specialized tissues can develop by cell differentiation in multicellular organisms  Differentiation involves the expressions of some genes and not others in a cell’s genome  The capacity of stem cells to divide and differentiate along different pathways is necessary in embryonic development and also makes stem cells suitable for therapeutic uses  Prokaryotes have a simple cell structure without compartmentalization  Eukaryotes have a compartmentalized cell structure  Electron microscopes have a much higher resolution than light microscopes  Cells can only be formed by division of pre-existing cells  The first cells must have arisen from non-living material  The origin of eukaryotic cells can be explained by the endosymbiotic theory  **Applications**   |  | | --- | | Questioning the cell theory using atypical examples, including striated muscle, giant algae and aseptate fungal hyphae. | | Investigation of functions of life in Paramecium and one named photosynthetic unicellular organism. | | Evidence from Pastuer’s experiments that spontaneous generation of cells and organisms does not now occur on Earth | | Structure and function of organelles within exocrine gland cells of the pancreas and within palisade mesophyll cells of the leaf. | | Ethics of the therapeutic use of stem cells from specially created embryos, from the umbilical cord blood of a new-born baby and from an adult’s own tissue | | Use of stem cells to treat Stargardt’s disease and one other named condition |   **Skills**   |  | | --- | | Draw and investigate microscopic structures of cells and tissues using a light microscope | | Calculate magnification of drawings and the actual size of structures and ultrastructures shown in drawings or micrographs | | Drawings of the ultrastructure of prokaryotic cells based on electron micrograph | | Drawings of the ultrastructure of eukaryotic cells based on electron micrographs | | Interpretations of electron micrographs to identify organelles and deduce the function of specialized cells |     **NOS**   |  | | --- | | -Looking for trends and discrepancies- although most organisms conform to cell theory, there are exceptions  -Developments in scientific research follows improvements in apparatus- the invention of the electron microscopes led to greater understanding of cell structure  -Testing the general principles that underline the natural world- the principles that cells only come from pre-existing cells needs to be verified  -Ethical implications of research- research involving stem cells is growing in importance and raises ethical issues | | **Understandings:**  Sub Unit: Intro to Cells  .- Describe parts and use of a compound microscope 9. Determine microscope magnification and field of view diameter  . -Estimate the size of sample in microscope field of view  -. Determine drawing magnification  - Determine size of specimen from a drawing with given magnification  -List functions of life  - State the cell theory  -. Compare the use of the word theory in daily language and scientific language  - Explain evidence and exceptions to the cell theory  - Describe emergent properties using examples  -Understand basics cell differentiation  -Explain C. elegans and other models for investigation of biology principles  -Discuss advantages and disadvantages of different viewpoints ( reductionistic model etc)  **TBD**  **Sub Unit: Origin of Cells**  **Sub Unit: Prokaryotic/Eukaryotic Cells**  **Sub Unit: Stem Cells** |