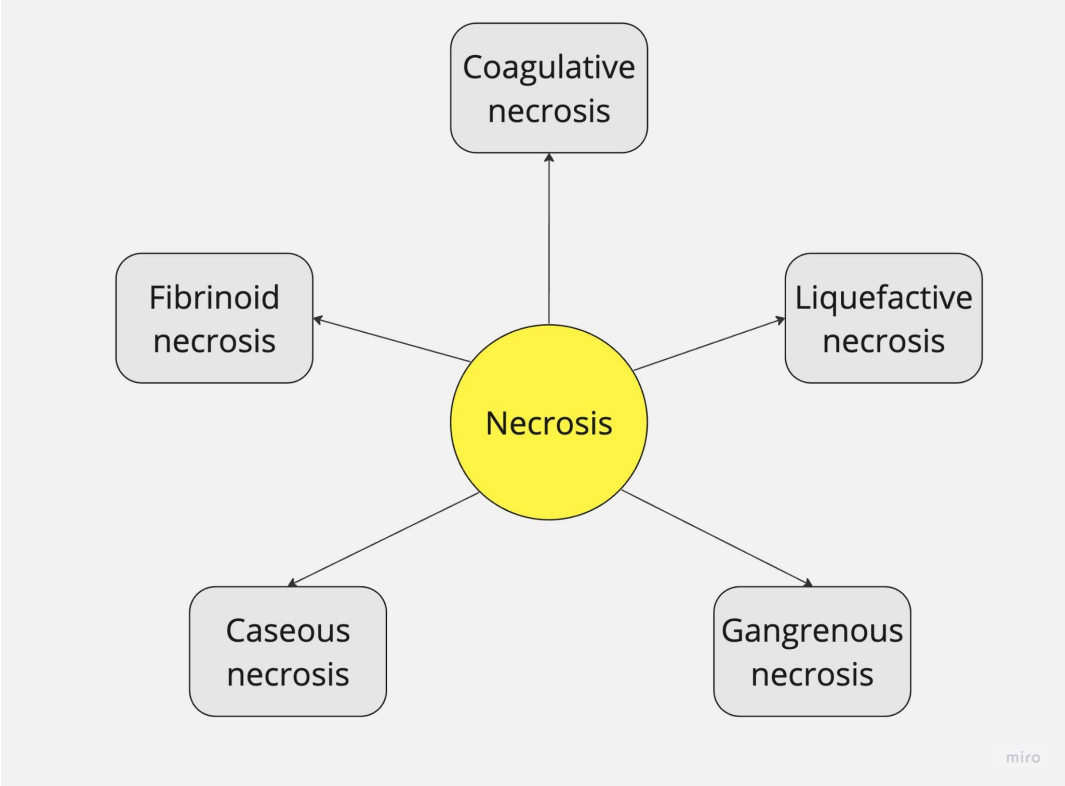
Scott Wang
sxw847@case.edu
CWRU School of Dental Medicine, Class of 2026

Foundations of Life Science

Problem Set B: Inflammation Topics

This study guide will go over big points covered in lectures pertaining to inflammation

1. Match each statement to the type of necrosis



Scott Wang
sxw847@case.edu
CWRU School of Dental Medicine, Class of 2026

a. Enzymatic digestion of dead cells that results in a viscous mass.
b. Often seen in the context of tuberculosis.
c. Clinical term denoting necrosis of multiple tissue planes resulting from dead tissue or a lack of blood supply.
d. Often seen in brain infarcts.
e. Often associated with ischemia secondary to an obstructed vessel.
f. Antigen-antibody complexes deposit in walls of arteries together with fibrin.
g. Has a cheese-like pattern.

2. Indicate which of the following are characteristics of mitochondrial damage. (Select all that apply)
    a. Formation of mitochondrial permeability transition pores.
    b. Loss of membrane conductive potential, which results in defective oxidative phosphorylation.
    c. Elimination of reactive oxygen species.
    d. Entrance of pro-apoptotic proteins into the mitochondria.
    e. Can be caused by increased intracellular Ca2+.

3. Write the word or phrase based on the given definition.
    a. Tightly regulated suicide program that degrades the cell. It is a mechanism involved in embryogenesis.
    b. Inadequate blood supply to an organ or body part, and is the most common cause of cell injury in clinical medicine.
    c. A compound that is normally produced during cellular respiration, but increased production results in oxidative stress.
    d. A phenomenon in which plasma membrane ruptures, cells/organelles swell, and ROS is generated, but does not involve caspase activation.
    e. Deficiency in the amount of oxygen reaching tissues.
    f. Gene that arrests the cell cycle at the G1 phase to allow for DNA repair.
    g. Enzymes involved in apoptosis that are activated either by mitochondrial or death receptor pathways.

Scott Wang
sxw847@case.edu
CWRU School of Dental Medicine, Class of 2026

4. What are the four main pathways of abnormal intracellular accumulations?

5. Briefly describe each of the terms that differentiate them.
    a. Steatosis-
    b. Atherosclerosis-
    c. Xanthomas-
    d. Anthracosis-

6. Describe the difference between dystrophic and metastatic calcification.

7. Fill in the blanks: All normal cells have a _____ capacity for replication. After a fixed number of divisions, they become _____ in a terminally non-dividing state known as _____. The major mechanism of this state is _____.

8. Describe the differences between acute and chronic inflammation. Be sure to list the predominant types of cells involved in each type of inflammation.

Scott Wang
sxw847@case.edu
CWRU School of Dental Medicine, Class of 2026

9. Indicate which of the following are characteristics of acute inflammation. (Select all that apply)
    a. Constriction of small blood vessels, leading to increase in blood flow.
    b. Increased permeability of blood vessels.
    c. Emigration of leukocytes from circulation.
    d. Involves exudate– extravascular fluid with low protein content and little/no cellular debris.
    e. Histamine acts as a mediator that will help increase blood flow.
    f. Neutrophils and macrophages are capable of phagocytosis and produce growth factors.
    g. Macrophages predominate first 6-24 hours and then are replaced by neutrophils afterwards.

10. Describe the steps of leukocyte recruitment to sites of inflammation.

11. Indicate the mediator based on the description.
    a. Cytokine that communicates between leukocytes and has roles in acute inflammation.
    b. Generated by lipoxygenase-mediated catabolism of arachidonic acid, and are important for suppressing inflammation by inhibiting leukocyte chemotaxis.
    c. Increases the feeling of pain, as well as vasodilation and vascular permeability.
    d. Causes arterial vasodilation and are stored in mast cell granules.
    e. Generated by lipoxygenase-mediated catabolism of arachidonic acid, and are important for chemotaxis, vascular permeability, and bronchospasm.
    f. Generated by COX-mediated catabolism of arachidonic acid, and are important for platelet function in hemostasis.

Scott Wang
sxw847@case.edu
CWRU School of Dental Medicine, Class of 2026

12. Describe the three main pathways involved in the complement system. What are the three important functions from C3 proteolysis?

13. Differentiate between the two major pathways of macrophage activation.

14. Describe granulomatous inflammation. How is this different from granulation tissue?

15. Characterize each of the following as labile tissues or stable tissues.
    a. Liver
    b. Oral mucosa
    c. Kidney
    d. GI tract
    e. GU tract
    f. Pancreas

16. Briefly describe scar formation in three steps.