BIO 26 PAL Worksheet
Week 4 (#2): Myocardial Infarction Case Study

A **myocardial infarction (MI)** or **heart attack** occurs when blood flow to the heart itself is inadequate and lack of oxygen supplied to the heart muscle leads to heart muscle death. This causes a drastically decreased pumping ability of the heart.

Stan Zwivelman is a 56-year-old car salesman who has been experiencing occasional chest pain (angina) for the last few months, but has refused to see a doctor. The night of his myocardial infarction, Stan is awoken by a sharp pain radiating down his left arm and a crushing pressure on his chest. He is nauseated, sweating, and his skin looks pale and feels cold to the touch. His breathing is "noisy" and labored and he feels very light headed. Stan calls 911 and is promptly transported to the nearest hospital.

In the ER, Stan's blood pressure is recorded as 102/80, and sequential ECG and serum levels of cardiac enzymes suggest a myocardial infarction of the left ventricle. X-rays reveal fluid accumulation in the lung, consistent with pulmonary edema.

1. As mentioned, a myocardial infarction occurs when blood flow to the heart itself is cut off. This might happen when a blood clot (embolus) blocks the flow through a blood vessel. Which blood vessel do you think is blocked in patients with a myocardial infarction?

2. Which information provided tells you that the stroke volume of the left ventricle is decreased?

3. How is the MI affecting overall cardiac output? Include a formula in your explanation.

4. How would a myocardial infarction lead to the development of pulmonary edema? Please include a drawing in your explanation. What is the big problem in pulmonary edema?

5. <u>Immediate</u> treatments for a myocardial infarction include anti-clotting drugs, nitroglycerin (vasodilator), oxygen, intravenous isotonic saline solution, beta-1 receptor blockers. Explain why each of these might be administered and how they could be helpful. (At first the administration of saline and the beta-1 receptor blockers might sound counter-productive. Explain why they make sense. Explain why the saline should be given before the receptor blockers.)

   BONUS: Stan receives coronary bypass surgery. When he is released from the hospital, he is informed that hypertension is a key risk factor for developing MIs. He is asked to stay on a low sodium diet. Explain why that may be.