

Lesson 8- Tissue Fluid Calculations

Feature	Blood Plasma	Tissue Fluid	Lymph
Hydrostatic pressure	High	Low	Low
Oncotic pressure	More negative	Less negative	Less negative
Cells	RBC, neutrophils, lymphocytes	Some neutrophils	Lymphocytes
Proteins	Plasma proteins	Few/none	Few/none
Fats	Transported in lipoproteins	Few	More near the digestive system

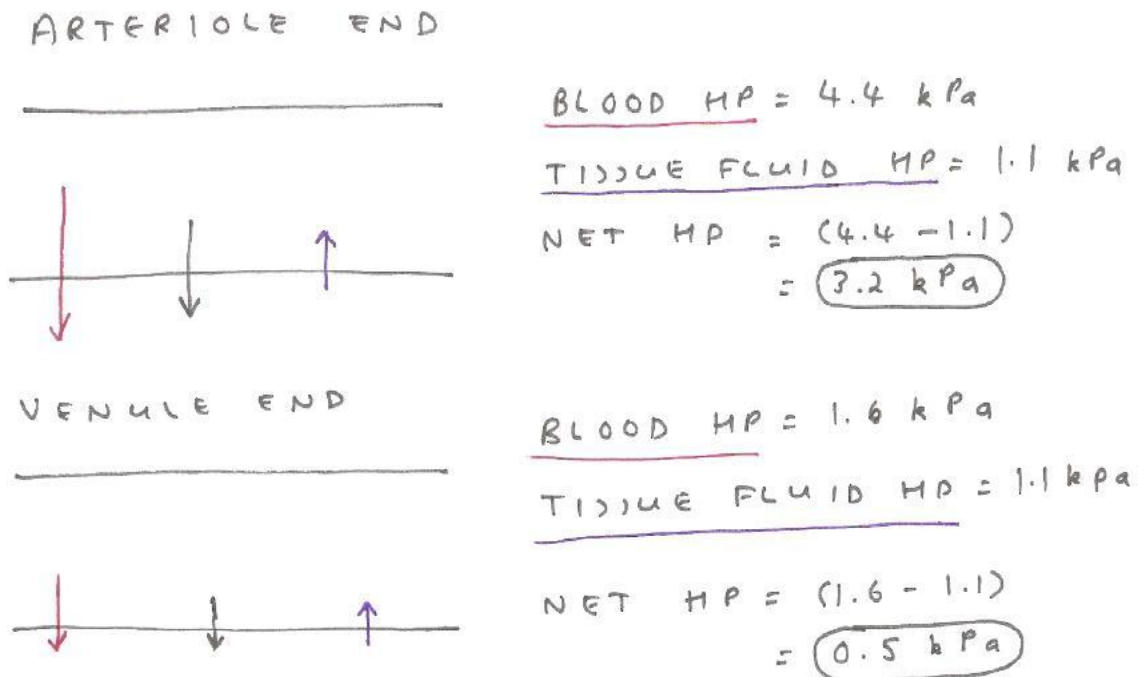
Hydrostatic pressures:

The **net hydrostatic pressure** is the main pressure which drives the formation of tissue fluid. This net pressure is formed because of two other hydrostatic pressures which act at the same time both ends of the capillary.

Blood hydrostatic pressure – the pressure of the blood generated by the heart forces fluid out of the capillary. This is higher at the arteriole end as that is closer to the heart.

Tissue fluid hydrostatic pressure – this pushes fluid back into the capillary. This is the same across the whole capillary.

Inside the capillary:



Net hydrostatic pressure is higher at the arteriole end than it is at the venule end.

Tissue fluid calculation questions:

1. The hydrostatic pressure of the blood pushes fluid out of a capillary; the hydrostatic pressure of the tissue fluid pushes fluid back into a capillary.

The oncotic pressure of the blood pulls fluid into a capillary; the oncotic pressure of the tissue fluid pulls fluid out of a capillary.

At one point along a capillary the hydrostatic pressure of the blood is **3.8 kPa** whilst the hydrostatic pressure of the tissue fluid is **1.1 kPa**. At this same point the oncotic pressure of the blood is **-3.4 kPa** whilst the oncotic pressure of the tissue fluid is **-1.3 kPa**.

Using the information above answer the following questions:

- a) Calculate the **net hydrostatic pressure**? (1)

- b) Calculate the **net oncotic pressure**? (1)

- c) Is tissue fluid being formed or withdrawn at this point in the capillary? Using your answers to parts a and b explain why. (3)

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2. If someone has a decreased plasma protein concentration they can suffer from an accumulation of tissue fluid in certain tissues resulting in a swelling (oedema). Explain why a decrease in plasma protein concentration would cause this (3).

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