The ‘apparent viscosity’ decreases with decreases vessel diameter
Haematocrit in many arterioles is lower than the systemic arterioles
  o Flow resistance is lower than expected from systemic viscosity
  o However, resistance still depends on haematocrit

White cells and platelets have negligible effects on blood viscosity

Clinical/Physiological Indices
BLOOD: done routinely
  • Haematocrit
    o Oxygen carrying capacity
    o Blood viscosity
  • Erythrocyte sedimentation rate (ESR)
PLASMA: only in research
  • Plasma viscosity
    o Affects blood viscosity
  • Fibrinogen concentration
RBCs:
  • Blood content
    o Haematocrit
    o Red Cell count
    o HB concentration in blood
  • Cellular Characteristics
    o Mean cell volume (MCV of red cell)
    o Mean cell haemoglobin (MCH)
    o Mean cell haemoglobin concentration (MCHC)

Consequences of Anaemia (low viscosity)
  o Reduced O2 carrying capacity
    o Oxygen saturation likely to be normal
  o Reduced viscosity and resistance to flow
    o Cardiac output may be high

Blood Rheology and Circulatory Pathology
1. Hyperviscosity Syndromes
   a. Elevated immunoglobulins
   b. Haematocrit (polycythaemia – genetic disorder or smoking in response to carbon monoxide)
   c. Hyperleukotic leukaemia
   d. Abnormal RBCs? E.g. sickle cell or malaria
2. Acute Phase Response (chronic) – response to damage or trauma
   a. Atherosclerotic
   b. Vascular disease
   c. Diabetes
   d. Smoking
   e. Increases fibrinogen \( \rightarrow \) increased plasma viscosity (and blood viscosity), increase RC aggregation, increased ESR