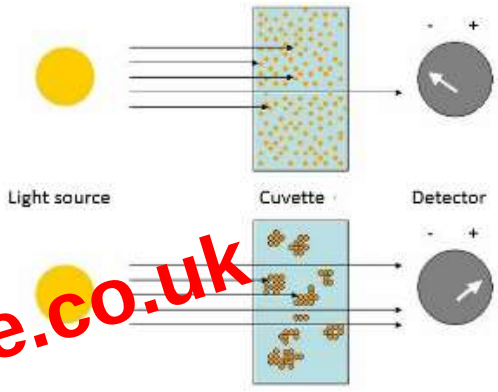
Platelet function testing

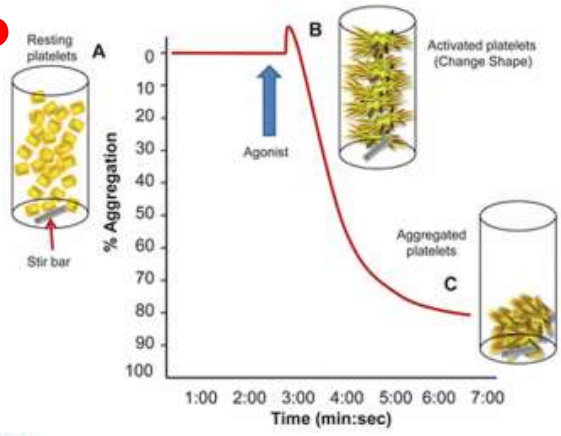
1. Full blood counts
    a. Low platelet count – thrombocytopenia
        i. Platelet production problems
            1. Acquired – Deficiency (e.g. vitamin B12), viral infections, chemotherapy, radiation, too much alcohol/poor diet
            2. Inherited – inherited thrombocytopenia
        ii. Platelet destruction problems
            1. Certain medications, hypersplensim, autoimmune disorders, pregnancy, bacterial infection in the blood, thrombotic thrombocytopenic purpura (TTP)
            2. Inherited thrombocytopenia, autoimmune disorders, TTP
    b. High platelet count – thrombocytosis/thrombocythemia
        i. Acquired – mutations in haematopoietic pregenitors (e.g. MPL, TPO, JAK2), chromic inflammation treatments, cancer treaments
        ii. Inherited - mutations in haematopoietic pregenitors (e.g. MPL, TPO, JAK2)
    c. Small or large platelets – micro or macro
        i. Platelet size and number can be independent of each other

Count	Normal range
RBC number	3.5 – 5.5 x 10^6 / µl
Haemoglobin Concentration	12 – 15 g/l
Haematocrit	36 – 48 %
WBC number	4.5 – 11 x 10^3 / µl
Platelet count	150 – 420 x 10^3 / µl
Mean platelet volume	7 -10 Femtolitres



Platelet function testing – light transmission aggregometry:

- LTA is the gold standard test of platelet function
    - Cells will block some of the light from getting to the detector
    - When resting the cells are all over the place so not much light will get through
    - When activated (form aggregates) so more light will reach the detector
    - B – at first cells become spiky = let even less light in. Shows if platelets change shape
    - Can see defects in platelet function
    - Integrillin – shape change but no aggregation of cell. Block integrins needed for aggregation
    - Range of agonists used to activate platelets



Agonist	Receptor	Notes
Collagen	GPVI	Also binds to α2β1 integrin
Collagen related peptide (CRP)	GPVI	Does not bind to α2β1 integrin
Thrombin	PAR1, PAR4	
ADP	P2Y1 &P2Y12	
U46619	TxA2 receptor	U46619 is an analogue of TxA2

    - Arachadonic acid (platelets secrete) is the precursor for thromboxane.
    - Agglutination
        - In aggregometry von Willebrand factor doesn't activate platelets
        - But the addition of drug Riscocetin causes vWF to bind to platelets = Agglutination
        - This is different to aggregation as it doesn't require activation of the intergins