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| **Module** | Anticoagulation management: patient’s guide to self-monitoring |
| **Topic** | Drugs affecting blood clotting |
| **Audience** | Self-monitoring warfarin patient |
| **Type** | Extra content |
| **Version** | 2 |

**Introduction**

There are two important processes involved in blood clotting. Firstly, platelets clump together to ‘plug’ the site of the injury, Secondly, the release of clotting factors, which respond in a complex cascade – the ‘**coagulation cascade’** - to form fibrin strands to strengthen this platelet plug.

Drugs prevent blood from clotting by either preventing platelets from clumping together – ‘platelet aggregation’ – or by blocking part of the coagulation cascade.

**Preventing platelet aggregation – the antiplatelet drugs**

As their name suggests, antiplatelet drugs prevent platelets from clumping together, which prevents the formation of a blood clot. The available antiplatelet drugs include **aspirin, clopidogrel, dipyridamole, ticagrelor** and **prasugrel**.

**Blocking the coagulation cascade – the anticoagulant drugs**

The coagulation cascade is, in fact, two separate clotting pathways: the intrinsic and extrinsic. These eventually join together to form the common pathway, which results in the formation of a fibrin clot. Clotting factors, designated by a Roman numeral I to XIII, are broken down by enzymes to their active form (indicated by the suffix a after the number – e.g. IXa), which then catalyse the next stage in the reaction.

***(image cascade1.png)***

**‘ The action of drugs on the coagulation cascade’**

Anticoagulant drugs prevent the formation, or action, of these clotting factors (Figure x). Vitamin K is essential in the formation of some of these clotting factors (factors II, VII, IX and X). Warfarin is a vitamin K antagonist and blocks the formation of these factors.

Heparin increases the activity of one of the body's natural anticoagulant molecules, known as antithrombin III(AT-III). By doing so, thrombin and factor Xa are inactivated, reducing the ability of blood to clot. Examples of heparin in common use are tinzaparin (Innohep®), enoxaparin (Clexane®) and dalteparin (Fragmin®).

More recently, new oral anticoagulant agents – abbreviated as NOACs – have become available. **Rivaroxaban (Xarelto®)** and **apixaban (Eliquis®)** act on factor Xa, thus preventing the formation of thrombin. **Dabigatran etexilate (Pradaxa®)** directly blocks the action of thrombin.