# Chapter 7

# ORAL ANTIAGGREGANT AGENTS IN CARDIOLOGY

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## INTRODUCTION

Hence thrombus formation resulting in vascular obstruction is one of the challenging issues in cardiology, great effort has been given to obtain an efficient anti-aggregation in order to reduce ischemic events. Three stages are essential in the formation of vascular thrombus. First, circulatory blood has to encounter a thrombogenic spot in the vessel. Then, platelet adhesion- activation -aggregation processes occur via various receptor stimulation and various substrate secretion, which creates a vicious circle with further increase in aggregation. In the last stage, clotting mechanism involves in the process to build a thrombus. There are different anti-platelet agents inhibiting different pathways to create anti-aggregation effect. In this chapter, orally active anti-platelet agents will be reviewed.

## I. THE 'GOOD OLD' ASPIRIN

Although extract of willow bark, which contains natural salicylic acid, has been consumed as a remedy for treating pain and fever for centuries, the synthetic form, acetylsalicylic acid or commonly known as aspirin, has been given to the market in the beginning of 1900 by the firm Bayer as a painkiller medicine, with no adequate knowledge of mechanism of action.

### Mechanism of action

It took more than 70 years to unveil the mechanism of action. That aspirin decreases the prostaglandin production, has been shown by Vane in 1971. Thereafter, the mechanism has been explained as aspirin irreversibly acetylates the enzyme 'cyclooxygenase' (COX) in platelets and inhibits thromboxane (TX) formation, which is related to its anti-thrombotic effect (1-3). Our current knowledge about aspirin is that the molecule is absorbed fast in the upper gastro-intestinal tract and inhibits the platelet aggregation in one hour. It is critical to remember, that

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hour after discontinuation. Similar to ticagrelor, transient dyspnea may also seen as an unfavourable side effect during cangrelor treatment (21,23).

### Clinical implications for P2Y12 inhibitors

Widespread use of coronary invasive treatments creates the need for better anti-aggregation strategies to prevent adverse events such as stent thrombosis or ischemic events. In this manner, dual anti-platelet therapy known as DAPT, including low dose aspirin with concomitant P2Y12 inhibitor, became a standard in current cardiology practice. DAPT is intensively studied to constitute a standardized therapy in cardiology to balance adverse ischemic and bleeding risks. Prasugrel and ticagrelor are more potent drugs than clopidogrel, however both drugs have higher gastro-intestinal bleeding risk than clopidogrel. Current guidelines recommend ticagrelor and prasugrel as a part of DAPT, beginning with a loading dose in the treatment of acute coronary syndromes requiring percutaneous coronary intervention (PCI) with a class 1B recommendation level. Clopidogrel as a part of DAPT and beginning with a loading dose in the treatment of patients with stable coronary artery disease treated with PCI or patients with acute coronary syndrome, who cannot receive ticagrelor or prasugrel (previous intracranial bleeding, indication for anticoagulation etc) is recommended with a level of class 1A (25). Current different European guidelines such as 2017 DAPT in coronary artery disease and 2020 acute coronary guidelines give a higher priority to ticagrelor and prasugrel than clopidogrel in the management of acute coronary syndromes however clopidogrel remains still as the first choice when stable coronary artery disease requires a percutaneous intervention. All the recent recommendations underline that the duration of DAPT should be personalized (can be as short as 1 month or long as 2 years on specific demands of individual profile) balancing the patients ischemic and bleeding risks (19,20,25).

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