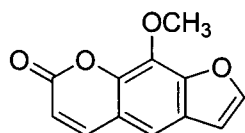
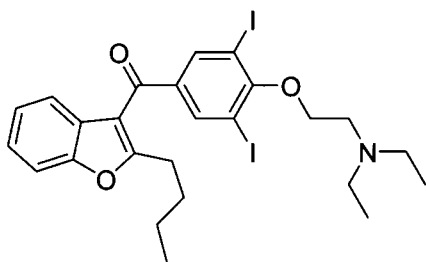


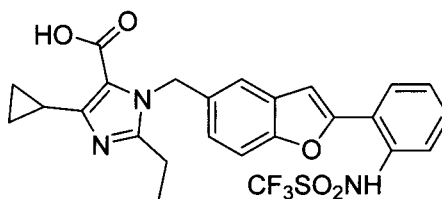
Benzofuran rings are also important functional moieties in commercial pharmaceuticals. Sapisartan is a useful compound for the treatment of hypertension and heart failure, while amiodarone (Cordarone) is used as an antiarrhythmic agent for the treatment of tachyarrhythmias. Finally, methoxsalen (Oxsoralen) and its derivatives are important compounds used to treat psoriasis, eczema, and certain skin cancers.



methoxsalen (Oxsoralen)



amiodarone (Cordarone)



sapisartan

The electron-rich thiophene and benzothiophenes are widely used as isosteres of their phenyl cousins in medicinal chemistry. These ring systems can be found in many pharmaceuticals with varied therapeutic applications such as the inhibition of platelet aggregation, treatment of asthma, chronic obstructive pulmonary disorder (COPD), bipolar disorder, psychosis, and prevention of osteoporosis, among many others.<sup>2</sup>

The importance of thiophenes in medicinal chemistry can be highlighted by the enormous economic success of thiophene-containing drugs. Pharmaceuticals containing thiophenes such as duloxetine (Cymbalta), olanzapine (Zyprexa), tiotropium (Spiriva), raloxifene (Evista), and zileuton (Zyflo) had combined sales of more than \$6 billion in the U.S. in 2010, while the blockbuster drug clopidogrel (Plavix) alone obtained sales in excess of \$6 billion in the same year.