

## Cardiac Medications in a Nutshell

---

Beta Blockers

### Atenolol

**Atenolol** is a drug belonging to the group of [β-blockers](#), a class of drugs used primarily in [cardiovascular diseases](#). Introduced in [1976](#), atenolol was developed as a replacement for [propranolol](#) in the treatment of [hypertension](#). **The chemical works by slowing down the heart and reducing its workload.**

Atenolol (trade name Tenormin) can be used to treat cardiovascular diseases and conditions such as [hypertension](#), [coronary heart disease](#), [arrhythmias](#), [angina](#) (chest pain) and to treat and reduce the risk of heart complications following [myocardial infarction](#) (heart attack)

### Carvedilol

**Carvedilol** is a [non-selective beta blocker](#) indicated in the treatment of mild to moderate [congestive heart failure](#) (CHF).

Carvedilol blocks the binding to those receptors, which both slows the heart rhythm and reduces the force of the heart's pumping. This lowers blood pressure and reduces heart failure.

### Sotalol

**Sotalol** (trade names **Betapace** and **Betapace AF**) is a [drug](#) used in individuals with rhythm disturbances ([cardiac arrhythmias](#)) of the [heart](#), and to treat hypertension in some individuals.

It lengthens the QT interval.

It also slows [atrioventricular \(AV\) nodal](#) conduction (beta-blocking effect).

Sotalol is not selected for its beta-blocking ability, but rather for its Class III (potassium blocking) properties.

Sotalol is used to treat [ventricular tachycardias](#)<sup>[2]</sup> as well as [atrial fibrillation](#).<sup>[3]</sup> Betapace AF is specifically labeled for atrial fibrillation.

It has also been suggested that it be used in the prevention of atrial fibrillation.<sup>[5]</sup>

## ACE Inhibitors

### Benazepril

**Benazepril**, brand name **Lotensin**, is a medication used to treat high blood pressure ([hypertension](#)), [congestive heart failure](#), and [chronic renal failure](#).

### Veterinary use

Benazepril [hydrochloride](#) is used to treat [congestive heart failure](#) in [dogs](#) and [chronic renal failure](#) in [cats](#).

## Diuretics

### Furosemide

**Furosemide** is a [loop diuretic](#) used in the treatment of congestive [heart failure](#) and [edema](#). It is most commonly marketed under the brand name **Lasix**. It has also been used to prevent [thoroughbred](#) and [standardbred](#) race horses from bleeding through the nose during races.

Furosemide is also used in animals for pulmonary edema, congestive heart failure (in combination with other drugs), and allergic reactions. Despite the fact that it increases circulation to the kidneys, it does not help kidney function, and is not recommended for kidney disease.

### **Spirolactone**

Used primarily to treat [heart failure](#), [ascites](#) in patients with liver disease, low-[renin hypertension](#), [hypokalemia](#), and [Conn's syndrome](#) as well as high blood pressure. On its own, spironolactone is only a weak diuretic, but it can be combined with other diuretics.

### **OTHERS**

#### **Diltiazem**

**Diltiazem** is a member of the group of drugs known as [benzothiazepines](#), which are a class of [calcium channel blockers](#), used in the treatment of [hypertension](#), [angina pectoris](#), and some types of [arrhythmia](#). It is a class 3 anti-anginal drug, and a class IV [antiarrhythmic](#). It incites very minimal reflex sympathetic changes.

Diltiazem is a **potent [vasodilator](#), increasing blood flow and variably decreasing the heart rate** via strong depression of A-V node conduction.

Diltiazem increases coronary blood flow and decreases myocardial oxygen consumption, secondary to decreased peripheral resistance, heart rate, and contractility. Because of its vasodilatory effects, diltiazem is useful for treating hypertension.

#### **Mexiletine HCl**

**Mexiletine** is used to treat [arrhythmias](#) within the [heart](#) - or seriously irregular heartbeats. It slows nerve impulses in the heart and makes the heart tissue less sensitive.

#### **Pimobendan**

**Pimobendan** (trade names **Vetmedin** and **Acardi**), is used in the management of [heart failure](#) in dogs, most commonly caused by myxomatous mitral valve disease (also known as [endocardiosis](#)), or [dilated cardiomyopathy](#).<sup>[1]</sup> Research has shown that pimobendan increases survival time and improves quality of life in patients with [congestive heart failure](#) when compared with [benazepril](#), an [angiotensin-converting-enzyme \(ACE\) inhibitor](#).

Pimobendan also causes peripheral [vasodilation](#) by inhibiting the function of [phosphodiesterase III](#). This results in decreased pressure, translating into smaller cardiac [preload](#) and [afterload](#) (decreases the failing heart's workload).

Pimobendan is often used in combination with three other drugs to palliate dogs with heart disease and reduce clinical signs of disease. These are:

- [Furosemide](#), a diuretic, to reduce pulmonary oedema. This can be given intravenously if the animal is in respiratory distress (6-8mg/kg), and then titrated down to the minimum dose required orally.
- [Spirolactone](#), an [aldosterone antagonist](#). This has two actions, firstly, as a [potassium-sparing diuretic](#), although its diuretic properties are small compared with those of furosemide. Secondly, it reduces aldosterone-mediated myocardial remodelling and fibrosis, slowing the progression of heart disease.

- An [ACE inhibitor](#), often [enalapril](#) (trade name Enacard) or [benazepril](#) (Fortekor). These drugs inhibit the action of [angiotensin-converting enzyme](#), producing a balanced vasodilation, along with other favourable effects.

Other drugs may also be used as required to manage certain [arrhythmias](#) that are often associated with heart disease.

## **Digoxin**

**Digoxin**, also known as **Digitalis**, is a purified [cardiac glycoside](#) extracted from the [foxglove](#) plant, [Digitalis lanata](#).<sup>[2]</sup> Digoxin is widely used in the treatment of various [heart conditions](#), namely [atrial fibrillation](#), [atrial flutter](#) and sometimes [heart failure](#) that cannot be controlled by other [medication](#).

Its main cardiac effects are

- A decrease of conduction of [electrical impulses](#) through the [AV node](#), making it a commonly used [antiarrhythmic agent](#) in controlling the [heart rate](#) during [atrial fibrillation](#) or [atrial flutter](#).
- An increase of [force](#) of [contraction](#) via inhibition of the [Na<sup>+</sup>/K<sup>+</sup> ATPase](#) pump

Digoxin also increases [vagal](#) activity via its action on the central nervous system, thus decreasing the conduction of electrical impulses through the [AV node](#). This is important for its clinical use in different arrhythmias.