Modes of Action for Medications That Control Hypertension

The mechanisms for controlling blood pressure (BP) are complex and integrate the actions of multiple different systems within the body. Input from the endocrine, muscular, cardiovascular, and renal systems all play major roles. Because of this integrative nature, there are numerous medications that can be prescribed to someone suffering from hypertension, each with a unique mode of action to reduce BP. Below are four such medications with a brief description of what they do. Use this information in conjunction with what we have learned in class to:

1. ***Draw*** **the entire pathway depicting how these actions ultimately reduce a person's blood pressure. It may help to draw two figures – one depicting normal physiology and one depicting what happens when a person is on the medication.**
2. ***Describe*** **all the effects of the medication that lead to a decrease in blood pressure.**

a) Diuretics: block the Na^+/Cl^- cotransporter on the apical side of the distal tubule to prevent the reabsorption of these two ions.

b) Beta-blockers: block the receptors for epinephrine in cardiac and smooth muscle.

c) ACE-inhibitors: inhibit the actions of angiotensin-converting enzyme (ACE).

d) Ca^{2+} channel blockers: selectively block or reduce the opening of L-type Ca^{2+} channel proteins in myocardium and vascular smooth muscle.