Control of Heart Rate

The beating of your heart is an_________________________ movement – one that is beyond your direct control. The nerve impulse that causes the heart to beat originates within the heart itself, at a bundle of specialized heart muscle tissue called the_________________________ (also called the_________________).

![Heart Diagram]

Function of Sinoatrial (SA) Node

The sinoatrial node is found in the_____________________. It stimulates muscle fibers that make the heart contract and relax rhythmically.

The 2____________________ (left and right) receive their electrical impulse at the same time, causing them to contract simultaneously.

The contracting of the atria stimulates a second node, called the__________________________, to send an electrical impulse to the___________________leading them to contract.

Function of Atrioventricular (AV) Node

The____________________ node is located within the right atrium on the________________ near the ventricle. Impulses from the AV node are carried along nerve cells called _______________________ that run down through the septum of the heart and out along the outer muscle of the ventricles. This branching ensures both ventricles contract at the same time.
Chemical Regulators of Heart Rate

When you are relaxed, the SA node fires at a regular rate (about ______ times per minute), maintaining a steady heart rate.

When the needs of the body increase, the heart must beat __________ to accommodate the increased need for delivery of __________ and __________ to the tissues, and removal of __________.

An increase in activity in the muscles produces a faster rate of ______________ in the cells.

This will increase the concentration of __________ in the blood.

The _________________ notes the increase and stimulates an increase in breathing rate, and sends a message to the ________________ (on the kidney) to stimulate the production of a hormone called _________________.

____________ enters the blood stream, and when it reaches the ______________, it stimulates the node to fire at a __________ rate (____________ heart rate).

To __________ the heart’s beating to a normal rate, the _______________ receives information from the ____________ receptors (______________) in the blood vessels in the neck (______________) that indicate __________ blood pressure.
This stimulates the nerves to release __________________, a chemical that ______________ the firing of the ___________ (___________ heart rate).

How sympathetic and parasympathetic nerves work together...........

Blood Pressure

Blood pressure is caused from blood pushing ______________ on the inside wall of __________ (and veins and other tubes - but measured mostly in arteries).

A normal blood pressure measurement for a person is about __________________________ (though this is not exact – it can range slightly higher or lower than these numbers and still be considered normal).

The two numbers in this measurement are ______________ / ______________.

________________________ is the pressure produced when the ventricles ______________ and blood is forced __________ of the heart. This is the __________________ pressure in the cardiac cycle.

________________________ is the pressure produced when the ventricles are __________ with blood (just before ______________). This is the __________________ pressure in the cardiac cycle.

To measure your blood pressure, an instrument called a __________________________ is used. It is wrapped around the arm just above the elbow and inflated to temporarily cut off blood flow though the __________________________ in the arm. The pressure in the cuff is lowered slowly, and the sounds of blood flow (pulses) are listened for and measured.
Blood Pressure Risks

Regulation of ________________ is very important. Low blood pressure reduces your capacity to transport blood. Elevated blood pressure can weaken the walls of arteries through loss of elasticity.

Diets high in __________ will _____________ the volume of blood in the body, since more ______________ will be retained in the body. This increases the amount of blood that must be pumped by the heart (elevating blood pressure).

Diets high in __________ (__________) may cause the arteries to become ______________ (see p. 494). Due to _______________ and ______________ of the artery wall an increase in blood pressure may result. This causes a condition known as ________________________.

Arteriosclerosis

Often caused by the build up _______________ and _______________ that then become hardened.

Prolonged use of stimulants like ________________, _______________ and _______________ which act like ________________ (to increase heart rate) may also cause an increase in blood pressure.

______________, ________________, ________________ (_______________) ________________, and ______________ are also factors that may contribute to blood pressure problems.

Vasodilation: The ________________ of blood vessels.

Muscles in the walls of blood vessels __________ so the blood vessels get bigger in _______________. This causes ________________ to flow down these ones.

Conversely, bodies can “purposefully” lose heat from the extremities in hot weather by sending blood there due ________________. Many dessert animals have huge thin ears with lots of blood vessels in them, that they vasodilate in the day to lose body heat so they don’t overheat.
Vasoconstriction: The ______________ of blood vessels.

Muscles in the walls of blood vessels ______________ so the blood vessels get ______________ ________________.

With the interplay of both of these, blood can be kept away from extremities in cold temperatures by ______________ so heat is not lost (from the fingertips for example) and can be kept closer to the middle of the body by vasodilation in central body parts so it stays where it is warmer and further away from the cold outside.