Source: https://drive.google.com/file/d/14fS4zgLHQQ0QwE7gSs2NBU_zotI4YuGz/view

As the blood exits the left ventricle, it passes through the aortic semilunar valve. The flow of blood, coupled with the mechanical structure of the heart valve, causes the valve to open. Essentially, the flow of blood and the forces associated with it cause the elastin in the ventricularis layer to “relax,” permitting the valve to recoil to the open position. When the valve is open, it experiences laminar flow across the ventricularis layer of the heart valve

During diastole, the ventricles relax, allowing the flow of blood to change. During this time, the backflow of blood into the heart applies a force on the aortic semilunar valve and causes it to close.

The force exerted on the aortic part of the heart causes the collagen in that layer to move slightly to reinforce the valve.

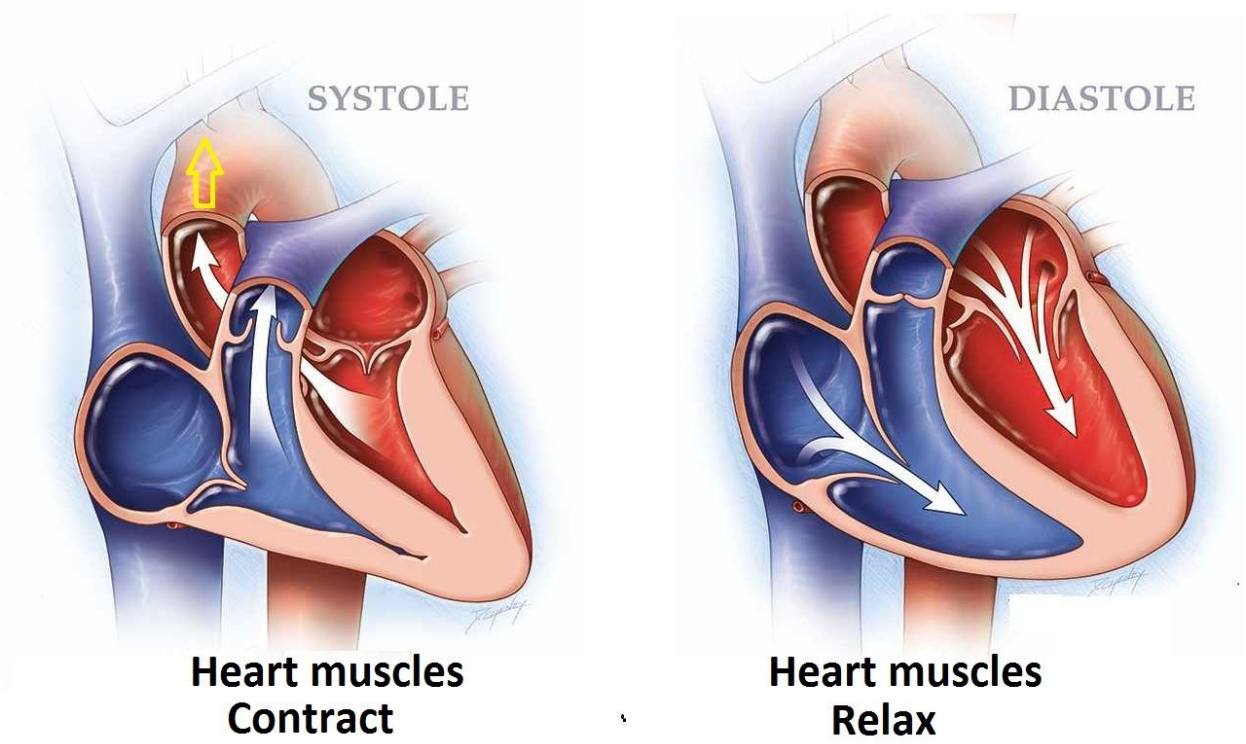
This rearrangement of the collagen causes the elastin in the ventricularis layer to stretch out some, allowing the three leaflets of the valve to meet in the middle and completely seal the valve and prevent blood regurgitation.

https://www.britannica.com/science/Youngs-modulus

Young's modulus is a measure of the ability of a material to withstand changes in length when under lengthwise tension or compression. Sometimes referred to as the **modulus** of elasticity, **Young's modulus** is equal to the longitudinal stress divided by the strain.

Within dynamic **tissues** such as blood vessels, the **heart** and lungs, the properties of tensile strength and passive **elastic** recoil are conferred primarily by collagen fibrils and **elastic** fibers respectively.

https://www.sciencedirect.com/science/article/pii/S1369702111700591



All materials experience some change with the application of force. However, different materials respond differently to stress. A measurement of the elasticity of a material is called the Young's modulus, and is determined as a ratio of stress to strain:

Young's Modulus (Y) =stress/strain Young's modulus can be used in the following equation:

$$F = Y(\Delta L\ L0\ )A$$

In this equation, F is equal to the force applied to the structure, Y is the Young's modulus for the material, ΔL is the change in length of the material when the force is applied to it, L0 is the initial length, and A is the cross-sectional area of the material.