**How is bug blood different from our own?**

**Rob DeSalle, Curator in the Division of Invertebrate Zoology at the American Museum of Natural History in New York City, offers this explanation:**

The major difference between insect blood and the blood of vertebrates, including humans, is that vertebrate blood contains red blood cells. Insects and other invertebrates, on the other hand, have what is called hemolymph¿a heterogeneous fluid that courses through their bodies, bathing all the internal tissues. Hemolymph is mostly [water](http://www.scientificamerican.com/topic.cfm?id=water), but it also contains ions, carbohydrates, lipids, glycerol, amino acids, hormones, some cells and pigments. The pigments, however, are usually rather bland, and thus insect blood is clear or tinged with yellow or green. (The red color that you see upon squashing a housefly or fruit fly is actually pigment from the animal's eyes.)

Unlike the closed circulatory system found in vertebrates, insects have an open system lacking arteries and veins. The hemolymph thus flows freely throughout their bodies, lubricating tissues and transporting nutrients and wastes. Whereas the vertebrate circulatory system serves primarily to carry oxygen throughout the body, insects respire an entirely different way¿namely, through tracheal tubes. In the case of the fruit fly *Drosophila,* for example, a series of tiny openings called spiracles line the impermeable outer skin of the fly, and these convey air directly to tracheal tubes that, in turn, convey air to the internal tissues.

Insects do have hearts that pump the hemolymph throughout their circulatory systems. Though these hearts are quite different from vertebrate hearts, some of the genes that direct heart development in the two groups are in fact very similar. The development and evolution of the vertebrate heart is currently the subject of much research.