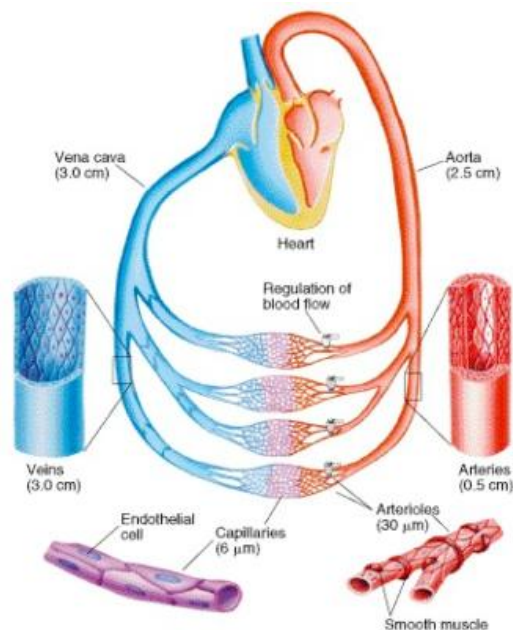


## Estimating capillaries

As the blood in the human body flows from the heart to all the cells of the body it passes through an branching system of blood vessels getting finer and finer until it reaches the capillaries, through which, chemicals diffuse to every cell of the body. This is shown schematically in the figure at the right. In the table below is shown the average diameter of the vessels at each level of branching – aorta, arteries, arterioles, and capillaries – and the average speed of blood that flows through them.

From this information, the principles of physics describing flow allows you to calculate the number of vessels that must be in each branching level. Use this to complete the empty spaces in the table. Explain how you calculated your results in the space below the table.\*



<i>Vessel type</i>	<i>Diameter (cm)</i>	<i>Avg. speed of flow (cm/s)</i>	<i>Number of vessels</i>
Aorta	2.0	48	1
Artery	0.4	45	
Arteriole	$5.0 \times 10^{-3}$	5	
Capillary	$8.0 \times 10^{-4}$	0.1	

\* Data from R. K. Hobbie, Intermediate Physics for Medicine and Biology, 3rd Ed. (Springer Verlag, 1997)