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## Functional morphology of the heart calls for a revised circulation model

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The question whether the heart is a pressure or a flow generating pump continues to be a subject of debate amongst clinicians and cardiovascular physiologists. It is based on the assumption that the heart, a hollow muscular organ equipped with valves, impels the blood through the systemic and pulmonary circuits. It will be argued that the long standing issue over the nature of the heart's function can be resolved by adopting the phenomenon-based, evolutionary model of circulation. The model shows that the movement of blood is the primary phenomenon generated at the levels of the capillaries. It exists before the functional maturity of the heart and is intricately linked with metabolic demands of the tissues. The pressure in the vessels, therefore, is a derived phenomenon resulting from the rhythmic interruption of flow by the heart in combination with the dynamic response of the peripheral vasculature. The heart thus functions as an impedance-pump generating pressure, but not the flow of blood. The proposed model will be supported by examples from embryology, comparative anatomy and a number of clinical scenarios.

### Biography

Branko Furst, MD, FFARCSI is a graduate of University at Ljubljana Medical School, Slovenia and completed residency in Anesthesiology at Queen Alexandra Hospital in Portsmouth and at the Middlesex Hospitals in London, UK. His academic career then took him to El Paso, Texas where he joined the faculty at the department of Anesthesiology at Texas Tech University Medical School. His research interests include cardiovascular physiology and mechanisms of general anesthesia. He is the author of the book *"The Heart and Circulation – an Integrative Model"* (Springer, 2013) and has lectured on various aspects of the circulation nationally and internationally. Currently he is Associate Professor of Anesthesiology at Albany Medical College, Albany, NY and divides his time between clinical anesthesiology, research and resident education.

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