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VENICE ASIAGO 2016

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The discovery of blood circulation at the University of Padova

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ABSTRACT

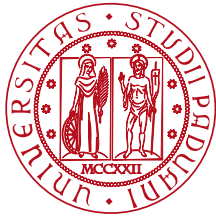
It was at the University of Padua that during Renaissance the concept of blood circulation was put forward, overturning the previous theory of Galen. According to the latter, the blood system consists of two compartments, venous (natural spirit) and arterial (vital spirit). The natural spirit is produced by the liver, with meal (chyle) transformation into blood. The venous blood goes to the periphery (centrifugally) through the vena cava. When arrived in the right ventricle, it passes through invisible septal pores into the left ventricle, where he mixes with the air draining from the lungs through the pulmonary veins, thus becoming vital spirit. Even Leonardo da Vinci (1452-1519) believed in Galen.

Realdo Colombo questioned this interpretation, suggesting that the blood reaches the left ventricle crossing the lungs. He did vivi-dissection in dogs, opened a pulmonary vein and realized that blood, not air was coming out.

Thereafter, Fabrici ab Acquapendente (1533-1619), Professor of Anatomy and Surgery, the one who built the famous permanent Anatomical Theatre (1594), which should be considered the first lab of research in the history of Medicine, discovered that valves are located into the systemic veins.

The centrifugal route of the blood through the veins thus was questioned by William Harvey (1579-1657), English student that graduated in Padua in 1602. He took note that the valves in the veins are so placed that they give free passage of the blood towards the heart and oppose the passage the contrary way. The blood cannot be sent by the veins to the limbs because of interposing valves, it should be sent through the arteries and return to the veins, whose valves do not oppose its coming that way.

He then, by vivo-dissection of deers, estimated the volume of blood passing through the heart in a



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given time and surmised that that the liver was unable to produce so much blood in such short period of time. It can be kept constant only in a close circulatory system. It was the dawn of physiology.

FURTHER READING

- 1) Thiene, G., (1997). The discovery of circulation and the origin of modern medicine during the Italian Renaissance. *Cardiovascular Pathology*. 6(2):79–88.