

# Veterinary Bioscience: Cardiovascular System



## WEEK 4 – DISORDERS OF COAGULATION AND FLOW

### LECTURER: DR SMITHA GEORGY

Smitha Georgy is a veterinary graduate from Kerala Agricultural University, India, and undertook PhD from The University of Melbourne. She briefly worked in mixed animal practice in Kerala before moving to Australia. Smitha then worked as a research scientist in the Department of Medicine, Monash University. In 2015, she completed the National Veterinary Examination and started small animal practice in Melbourne. She started her career as an anatomic pathologist in 2018 when she joined the Melbourne university as a lecturer. She became a diplomate of the American College of Veterinary Pathologists in 2021. Her research interests are in epithelial cancers affecting the skin, oral cavity, and oesophagus, and is an author of several publications



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## LECTURE 17 – PERTURBATIONS OF FLOW II – THROMBOSIS

**Thrombosis** is the inappropriate formation of a blood clot (thrombus) within the cardiovascular system. Thrombosis similar to haemostasis is a clotting process involving platelets, clotting factors and endothelial cells. The resultant thrombus protrudes at least partially into the lumen of the affected vessel and may, therefore, interfere with blood flow.

Three major mechanisms can be responsible for thrombosis: vascular endothelial injury, hypercoagulability of blood, and/or altered haemodynamics. Of these, endothelial injury is the most important trigger.

Once formed, a thrombus may continue to enlarge (**propagation**) due to continued blood coagulation occurring on its surface. Thrombi may resolve via the process of **fibrinolysis** catalysed by plasmin (particularly in the period soon after thrombosis occurs) or via **organization** by phagocytic macrophages and ingrowth of endothelial cells, vascular smooth muscle cells and fibroblasts. Thrombi may also undergo fragmentation, yielding **thromboemboli** that can pass downstream to become trapped in smaller calibre blood vessels. The gross appearance of thrombi and its consequences are discussed.

### INTENDED LEARNING OUTCOMES

At the end of this lecture, you should be able to:

- Define and use the terms thrombus, thrombus propagation organization of thrombi and fibrinolysis
- Explain the circumstances that may lead to thrombosis
- Explain the fate of thrombus in vessels

### KEYWORDS

Thrombosis, haemostasis, Virchow's triad, blood turbulence, blood hypercoagulability, platelets, fibrinogen, thrombus propagation, lines of Zahn, septic thrombi, fibrinolysis, plasmin, organization of thrombi

## **FURTHER READING**

D.A. Mosier. Vascular disorders and thrombosis. In: *Pathologic Basis of Veterinary Disease*. 4th ed. Ed. M.D. McGavin and

J.F. Zachary. Mosby Elsevier, St Louis, USA (2007). pp. 63-99. **(emphasis on pp. 86-91 and 93-95)**

D.O. Slauson. Disturbances of blood flow and circulation. In: *Mechanisms of Disease. A Textbook of Comparative General Pathology*. D.O. Slauson and B.J. Cooper. 3rd edition. Mosby, Inc. St Louis, USA (2002). pp. 76-139. **(emphasis on pp. 89, 99-102, 104-107, 110-116 and 119-124)**