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A COMPUTATIONAL MODEL OF THE INITIAL/PRE-COLLECTING LYMPHATICS, AND A STUDY OF LYMPHATIC VALVOGENESIS

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This thesis describes a computational model for an initial/pre-collecting lymphatic network and a study on valvogenesis (formation of valves in the lymphatics during embryonic development). The computational model was applied to rat mesenteric lymphatic networks (19- and 163-segment) with sparse secondary valves. The network was simulated with these secondary valves being operational and nonoperational. Sensitivity of parameters, such as the vessel stiffness, interstitial resistance and the availability of primary valves, on the cycle-mean outflow rate from the 19-segment network was considered. Results for the study on valvogenesis, simulations done on 2D images of the embryonic skin lymphatic network, suggest that fluid shear stress does not localise the expression of Prox1 (a transcription factor responsible for valve formation).

Some of this research has been published in [1, 2].

References

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[2] B. O. Ikhimwin, C. D. Bertram, S. Jamalian and C. Macaskill, 'Correction to: "A computational model of a network of initial lymphatics and pre-collectors with permeable interstitium"', *Biomech. Model. Mechanobiol.* **19**(2) (2020), 677–679.

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