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Properties of the microcirculation in capillary bundles of rat spinotrapezius muscle fascia¹ FRANK JACOBITZ, CHERYN ENGBRECHT, IAN METZGER, COLIN PORTERFIELD, University of San Diego — Properties of the microcirculation in capillary bundles of rat spinotrapezius muscle fascia are investigated using microscope observations, empirical modeling, and numerical simulations. Capillary bundles consist of a network of feeding arterioles, draining venules, and capillary vessels. A dozen samples of muscle fascia tissue were prepared for microscope observation. The chosen method of preparation allows for the long-term preservation of the tissue samples for future studies. Capillary bundles are photographed under a microscope with 40x magnification. From the images, the microvasculature of the tissue samples is reconstructed. It was found, for example, that the distribution of vessel length in a capillary bundle follows a log-normal law. In addition to a statistical analysis of the vessel data, the network topology is used for numerical simulations of the flow in the capillary bundles. The numerical approach uses a sparse-matrix solver and it considers vessel elasticity and blood rheology. The numerical simulations show, for example, a strong pressure drop across the capillary vessels of the bundle.

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