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The development of automated methods for supporting human experts provides tangible benefits in the context of clinical decision-making. Automated segmentation of capillary structures in histology is a difficult task; this is due to the wide variability of shapes and sizes adopted by the capillaries once the biological sample is prepared and fixed on a glass slide. Topology and homology, on the other hand, provide convenient tools for classifying spaces that are less sensitive to the geometry of the objects.

This work introduces a method for the segmentation of aggregated cells into capillary forms in histological images based on the principles of persistent homology. The approach deals with changing the representation of a histological image into a collection of simplicial complexes. Vertices represent cells and edges represent relationships between cells. Homology classes dimensions one and two, are identified in order to perform the segmentation.

Images acquired from histological sections of ovarian tissue are used to demonstrate the effectiveness of quantifying lymphatic vessels. The accuracy is verified against expert annotations. Results are provided on a per-object basis. (Received September 16, 2019)