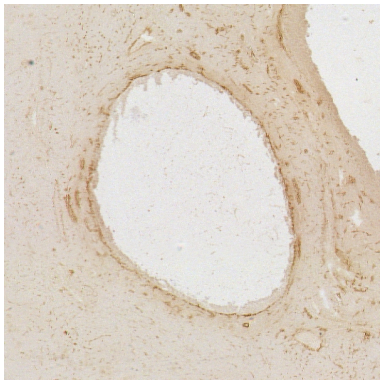
Tutorial: Segmentation of follicles

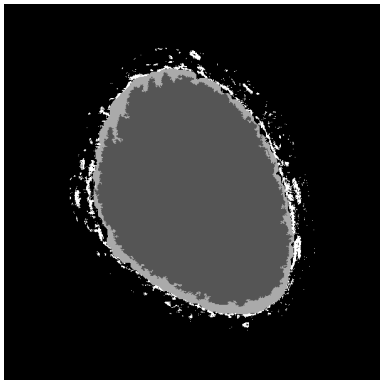
Note

This practical work aims to investigate image segmentation with a direct application to ovarian follicles. The overall objective is to extract and quantify the granulosa cells and the vascularization of each follicle included in an ewe's ovary.

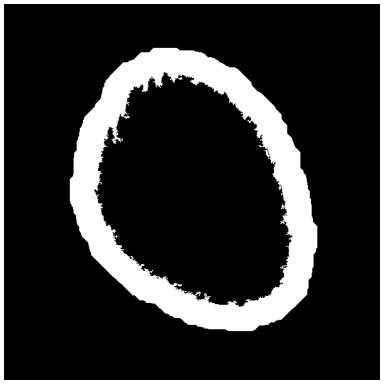
The image to be processed is a 2D histological image of an ewe's ovary acquired by optical microscopy in Fig.1. The presented image contains one entire follicle (the white region and its neighborhood) and a part of a second one (right-upper corner). The follicle is composed of different parts shown in: antrum, granulosa cells and vascularization. The theca is the ring region around the antrum where the follicle is vascularized.



(a) Original image with one entire follicle (white region and its neigborhood).



(b) Antrum (dark gray), granulosa cells (light gray) and vascularization (white) of the follicle.



(c) Theca.

Figure 1: Different parts of the follicles, to be segmented.

1 Vascularization

- Load and visualize the image.
- Extract the antrum of the follicle.
- Extract the vascularization (inside a ring around the antrum).

2 Granulosa cells

Which kind of processing could be suitable for extracting the granulosa cells?

3 Quantification

Provide some geometrical measurements of the different entities of the follicle (antrum, vascularization, granulosa cells).