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3D image reconstruction of biological tissues

To analyse the movement and reaction of drugs in tissues, a detailed knowledge of the tissue structure is needed. To acquire a better understanding and provide a model for mathematical analysis and simulations, we construct a 3D-model from given image stacks showing various tissues. This model builds the foundation for particle simulations and narrows the gap from a discrete to an experimental approach. Furthermore the model serves as a verification method for simulation data and provides feedback to refine the simulation process.

The image recognition is implemented using OpenCV, which is the standard library for computer vision and comes with a variety of efficient algorithm useful to identify the different tissue structures. With the use of an image stack the distinguished tissue structure can be constructed to a geometrical model. For verification and better understanding of the results we generate a 3D visualisation using OpenGL. Statistical data can also be calculated using the generated model, for instance cell volume fraction or mean cell density.