Workflow	Functions used at each step

Workflow

Raw Images (3-D confocal stacks)
(format : ".lif")
Transfer medium: SFTP server

↓

3-D stack
(format: ".mat")

↓

Resized axial sections
(format: ".tif")

↓

Segmentation of the axial sections

↓

Unwrapping of the blood vessel onto a 2D plane

↓

Correcting for ellipticity of the vessel and non-uniform vessel diameter

↓

2-D map segmentation and data extraction

↓

3-D reconstruction

↓

Morphological analysis

Functions used at each step

Functions used:
ReadinglifFiles
Uses ci_loadlif which is a modified function based on HKLoadlif by Hiroshi Kawaguchi

Functions used:
Lif2tif

Function used:
InitializeSeedsAndMaskbloodVessel
ELSA_3segmentCellsV4_convhullseeds
modifySeedsAndMaskV5

Functions used:
ReadingIntensitiesAlongVessel
ReadingIntensitiesAlongVesselChannel1

Functions used:
lenmap2D_V3
CurvatureCorrection

Functions used:
segmenting2Dmap_MultipleMovies
extractNodesGridAnalysis2Dmap
gridAnalysis_interfaceOrientationNewZT6

Functions used:
TranformationTo3D_V2

Functions used:
Listed in the report.

Figure 1: Flow chart of the workflow with names of the functions used at each step.

Analysis and final figure generation

For all the subsequent analysis, the inbuilt *matlab* functions are used. The functions used to generate figures are all written by R.M and are listed below:

1. *Fig3* (used to calculate and generate distributions of cell area, blood vessel diameter and neighbor number distributions; other functions used: *NeighNumextraction*)

2. *Fig4* (used to calculate and generate distributions major and minor axis lengths, cell height, cell width and cell orientation angles)

3. *Fig5a_V3*, *Fig5b*, *Fig5c*, *Fig5e* (used to determine the fractions of cells of each orientation (axial or circumferential or other), preferential cell orientation in a blood vessel)

4. *Fig5e* (used to generate heatmaps of probability distributions of cells as a function of aspect ratio and orientation angle).