

Fig. S1. Hemodynamic data for entire arclength at the time point 30 minutes before sprout is visible. Pressure contours for each embryo are presented. Shear stress and vorticity values for the entire contour are shown, with the region at higher pressure indicated by a grey line rather than a coloured line.

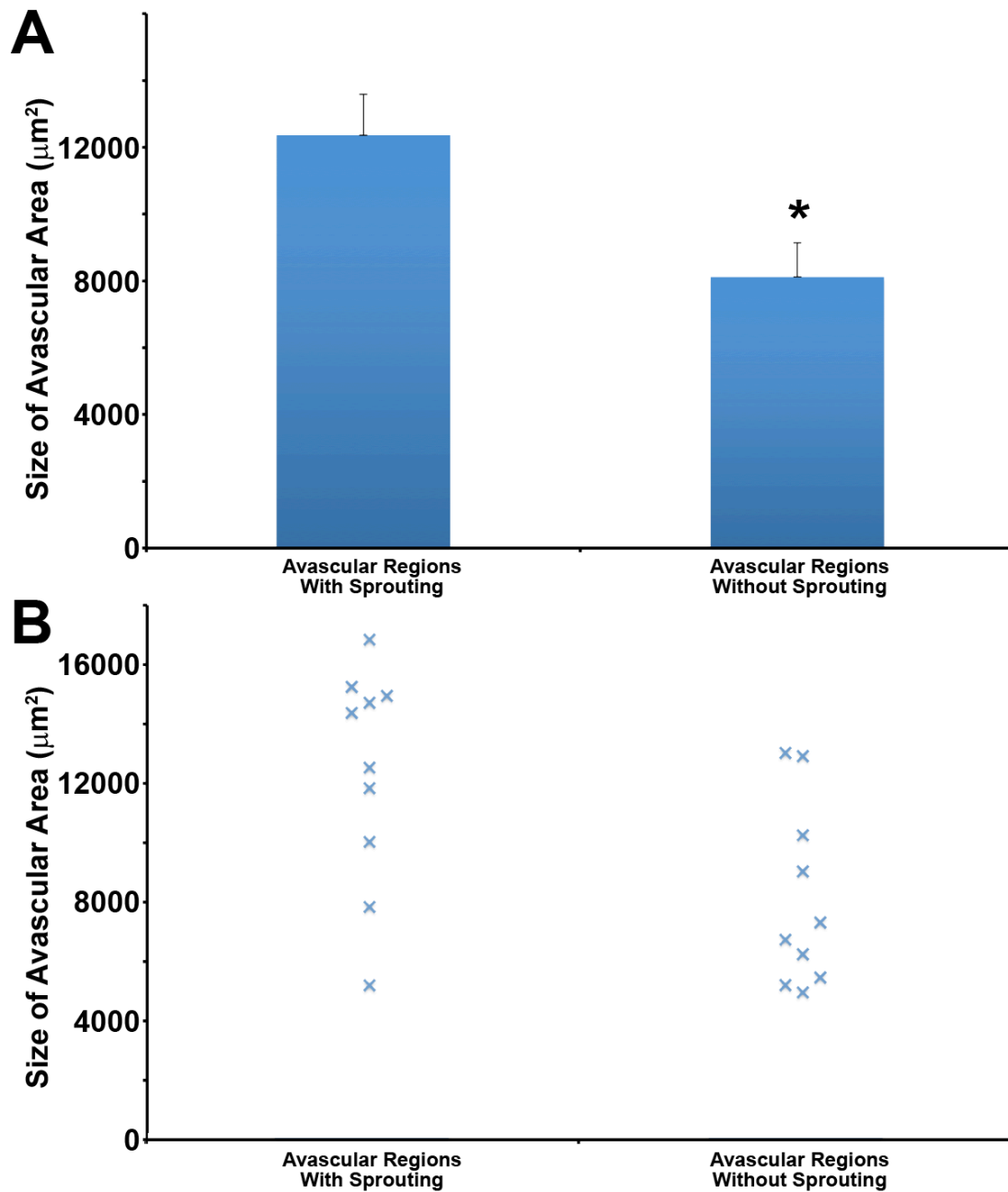
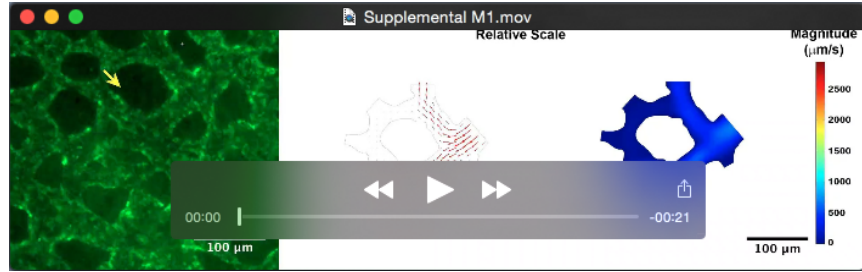
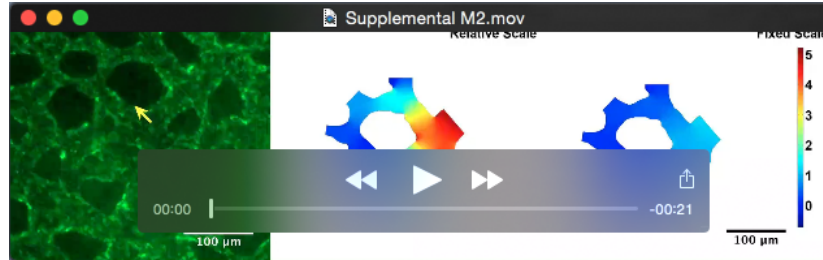


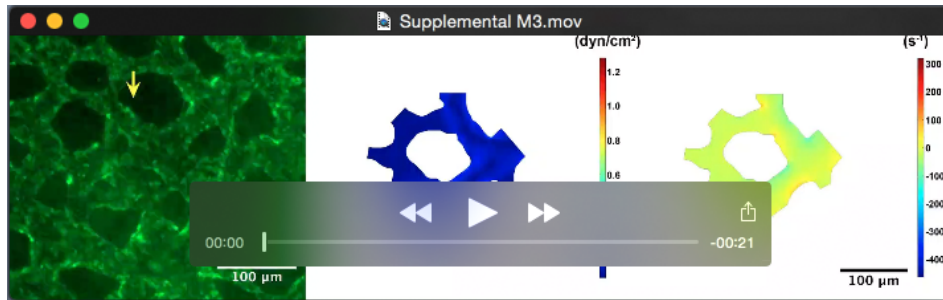
Fig. S2. Area of avascular region is larger in sprouting than non-sprouting location. The area of avascular regions at the time of sprouting was calculated, and compared to the area of avascular regions, at the same time point, that never sprouted during the entire time-lapse recording (A). Though sprouting avascular regions were larger than non-sprouting region ($p < 0.05$), size of the region alone cannot predict which avascular regions sprout due to the large spread of the data.



Movie 1. Blood velocity analysis around sprouting angiogenesis. Results of the analysis of blood velocity changes during sprouting are presented. The left panel shows the endothelial cell behaviour during the time period of analysis. The centre panel shows the velocity vectors for the blood flow during peak systole in the network. Velocity vectors are sized based on the maximum velocity at that specific time point (i.e. scale is relative). The right panel shows the absolute velocity magnitude during peak systole in these vessels during angiogenic sprouting. All scale bars represent 100 μm .



Movie 2. Pressure changes during sprouting angiogenesis. Results of the pressure calculations during sprouting are presented. The left panel shows the endothelial cell behaviour during the time period of analysis. The centre panel shows the relative pressure, where red represents the highest pressure at that specific time point. The right panel shows the same data, but the colour scale remains constant throughout all time points. All presented values are for peak systole however blood flow dynamics were analysed for the entire cardiac cycle at each time point. All scale bars represent 100 μm .



Movie 3. Shear stress and vorticity analysis around sprouting angiogenesis. Results of the shear stress and vorticity calculations at peak systole during sprouting are presented. The left panel shows the endothelial cell behaviour during the period of analysis. The centre panel shows the results for the shear stress calculations, with a constant colour scale for all time points. The right panel shows the results for the vorticity calculations, with a constant colour scale for all time points. All scale bars represent 100 μm.