**Supplementary material accompanying “The establishment of maternal blood supply to the placenta: Insights into plugging, unplugging and trophoblast behaviour from an agent-based model”**

**Authors:** Rojan Saghian, Gib Bogle, Joanna L James, Alys R Clark

**Time courses of cell migration.**

Supplementary figures illustrating time courses of cell migration as predicted by the agent based model described in this study.



Figure S1: The evolution of the plug over 1 day of simulation time with baseline parameterisation (Table 1 and comparable to Figure 5). The length of the spiral artery segment modelled and a cross-section near the centre of the plug at t=0 min are shown. The plug stays relatively intact in this simulation, with a small amount of cell movement along the vessel wall.



Figure S2: The evolution of the plug over 1 day of simulation time with baseline parameterisation, except the strength of the axial chemotaxis force is doubled compared with Figure S1 (comparable to Figure 5). The length of the spiral artery segment modelled and a cross-section near the centre of the plug at t=0 min are shown. While the plug stays relatively intact in this simulation, the speed of cell migration along the vessel lumen is increased compared with Figure S1.



Figure S3: The evolution of the plug over 1 day of simulation time with baseline parameterisation, except the radius of influence of the axial chemotaxis force is increased compared with Figure S1 (comparable to Figure 6). The length of the spiral artery segment modelled and a cross-section near the centre of the plug at t=0 min are shown. The plug retains less cells than in Figures S1 and S2, and the speed of cell migration along the vessel lumen is increased compared with Figure S1. Note that the inset of Figure 6 shows a cross-section of the artery upstream of the plug to illustrate that cells that migrate up toward the decidua do so primarily on, or near the vessel wall.



Figure S4: The evolution of the plug over 1 day of simulation time with baseline parameterisation, except driving pressure for blood flow is increased from 10 mmHg to 75 mmHg compared with Figure S1 (comparable to Figure 7). The length of the spiral artery segment modelled and a cross-section near the centre of the plug at t=0 min are shown. The plug retains less cells than in Figures S1, and the speed of cell migration along the vessel lumen is increased compared with Figure S1, as cells are pushed away from one another within the plug structure due to relatively high flow pathways.



Figure S5: The evolution of the plug over 1 day of simulation time with baseline parameterisation, except driving the magnitude of the radial chemotactic force Frad to ten times baseline and a greater influence of axial chemotactic forces within the lumen of the vessel than at baseline compared with Figure S1 (comparable to Figure 7). The length of the spiral artery segment modelled and a cross-section near the centre of the plug at t=0 min are shown. The plug retains far less cells than in Figures S1, and the speed of cell migration along the vessel lumen is rapid and as cells are pulled away from within the plug structure to, and along the vessel wall.