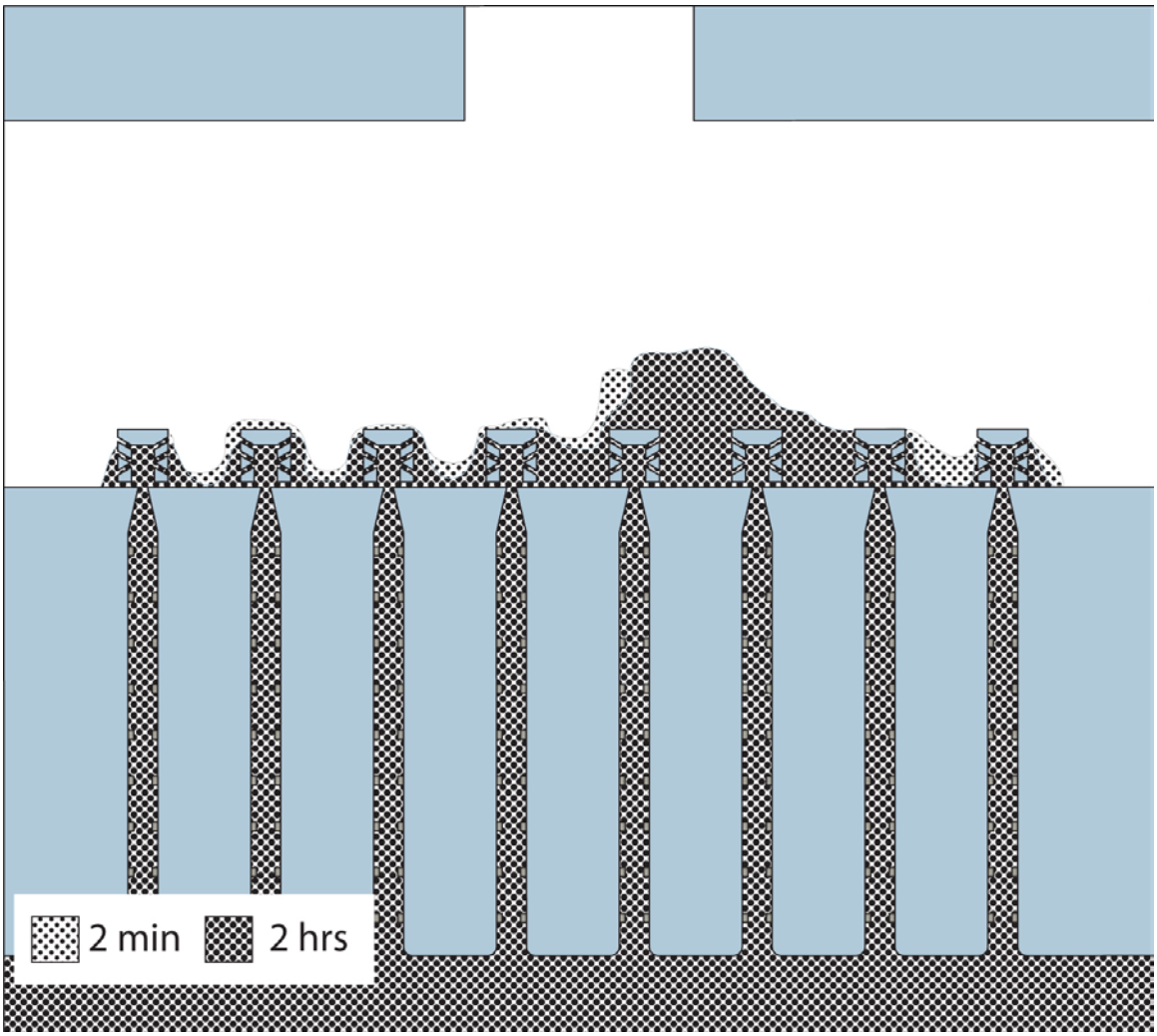
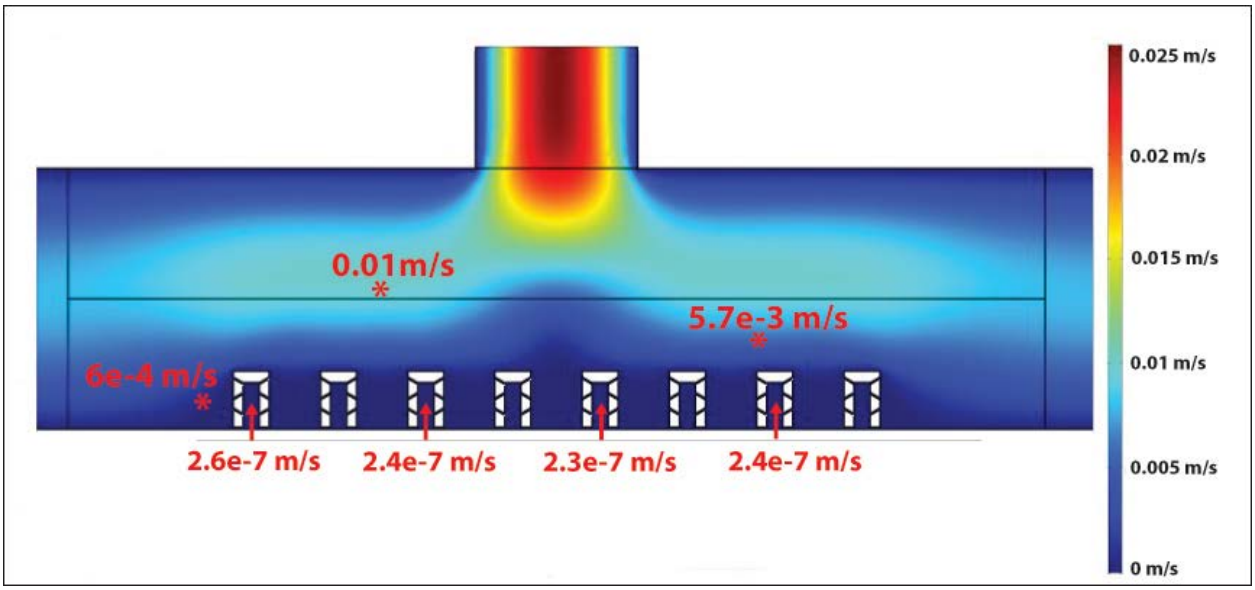
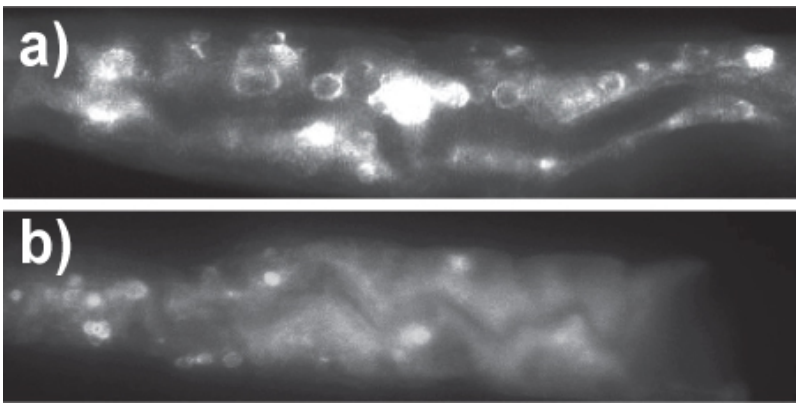


Supplementary Figure 1. Sample gel behavior of the sodium alginate/gelatin mixtures. Once the gel is formed, it is extremely difficult to erode and remove the gel from the bulk and the muzzle area. We thresholded images taken at different time-points to show the extent of the gel in the device. Between 2 minutes and 2 hours after gelation (15% gelatin solution), there is minimal removal from the bulk of the channel and no removal from the muzzles themselves. This would completely prevent animals from feeding. Therefore, it is necessary to remove the sodium alginate/gelatin mixture from the delivery channels and the muzzles prior to gelation.



Supplementary Figure 2. COMSOL model of the velocity field surrounding the muzzle area. The results of the simulation show a five orders of magnitude decrease in velocity inside the muzzles when compared to the bulk of the nutrient delivery channel. The system was modeled as steady state using the Incompressible Navier-Stokes module. Inlet and outlet velocities were specified based on the flow rate used and the cross-sectional channel area.



Supplementary Figure 3. Comparison between on-device and agar pad imaging. The subset of lipid droplets visible in animals expressing R01B10.6:GFP are being imaged against a background of auto-fluorescence in the animal gut. These objects are very small (~1 to ~6 μm) and comparatively dim. On an epifluorescent compound microscope at 40x magnification, we were only able to observe larger droplets (> 2μm). Images were generated by superimposing slices obtained at different z-positions (using maximum intensity). The image on top (a) has been obtained from an animal on device and the image on the bottom (b) has been obtained from an animal immobilized on a standard agar pad with sodium azide.

Electronic Supplementary Material (ESI) for Lab on a Chip