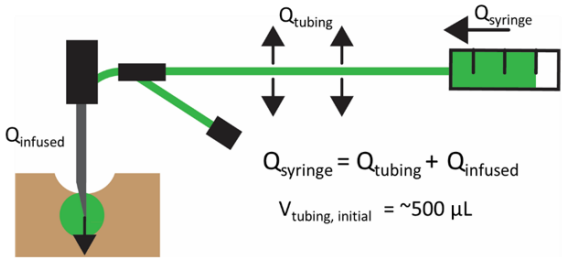
ONLINE SUPPLEMENTARY MATERIALS

(a)



(b) Vary infusion rate and EC%

Nominal volume = 100 µL	Ethanol	3% EC-ethanol	6% EC-ethanol	
1 mL/hr	92.8 ± 8.6 µL	79.4 ± 12.3 µL	76.7 ± 14.5 µL	**83.0 ± 13.3 µL**
10 mL/hr	96.9 ± 4.6 µL	97.3 ± 3.5 µL	93.0 ± 5.9 µL	**94.8 ± 4.9 µL**
	94.9 ± 6.7 µL	**88.4 ± 12.7 µL**	**84.9 ± 13.5 µL**	

(c) Vary infusion volume

Nominal volume	Actual volume
50 µL	40.6 ± 5.2 µL
100 µL	93.0 ± 5.9 µL
200 µL	197.0 ± 2.3 µL

Fig. S1. (a) Schematic of effects of tubing compliance during an injection. (b) Tabulated actual infusion volumes at the end of the post-infusion phase for experiment 2 and (c) experiment 4. Experiments are described in Table I. All groups had a sample size of n = 5.

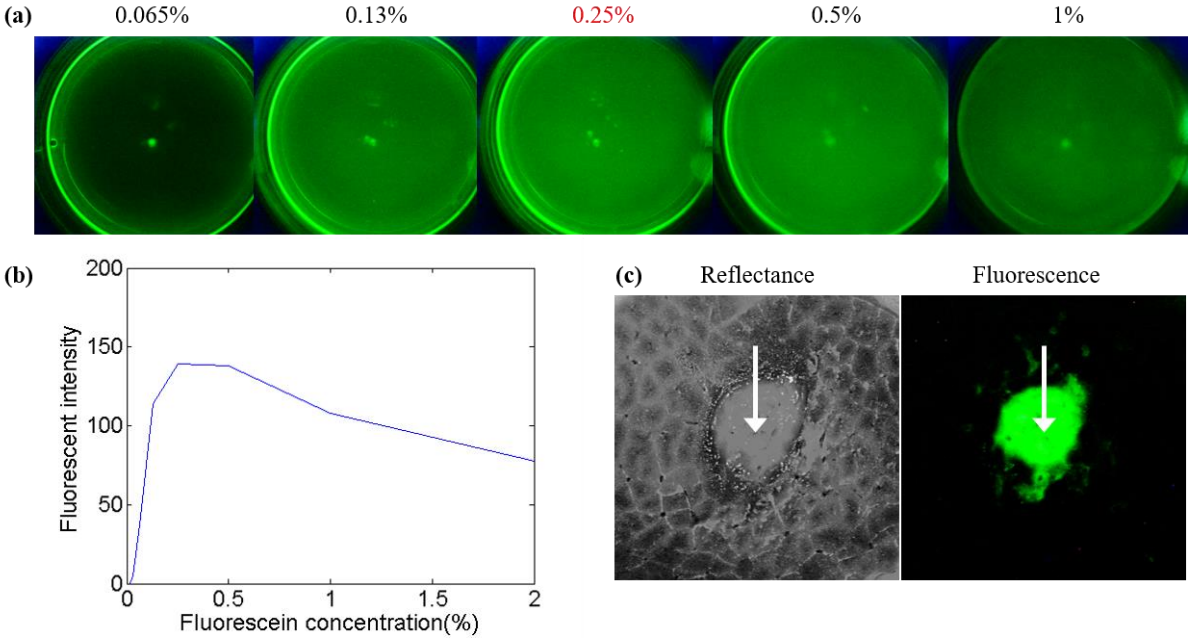
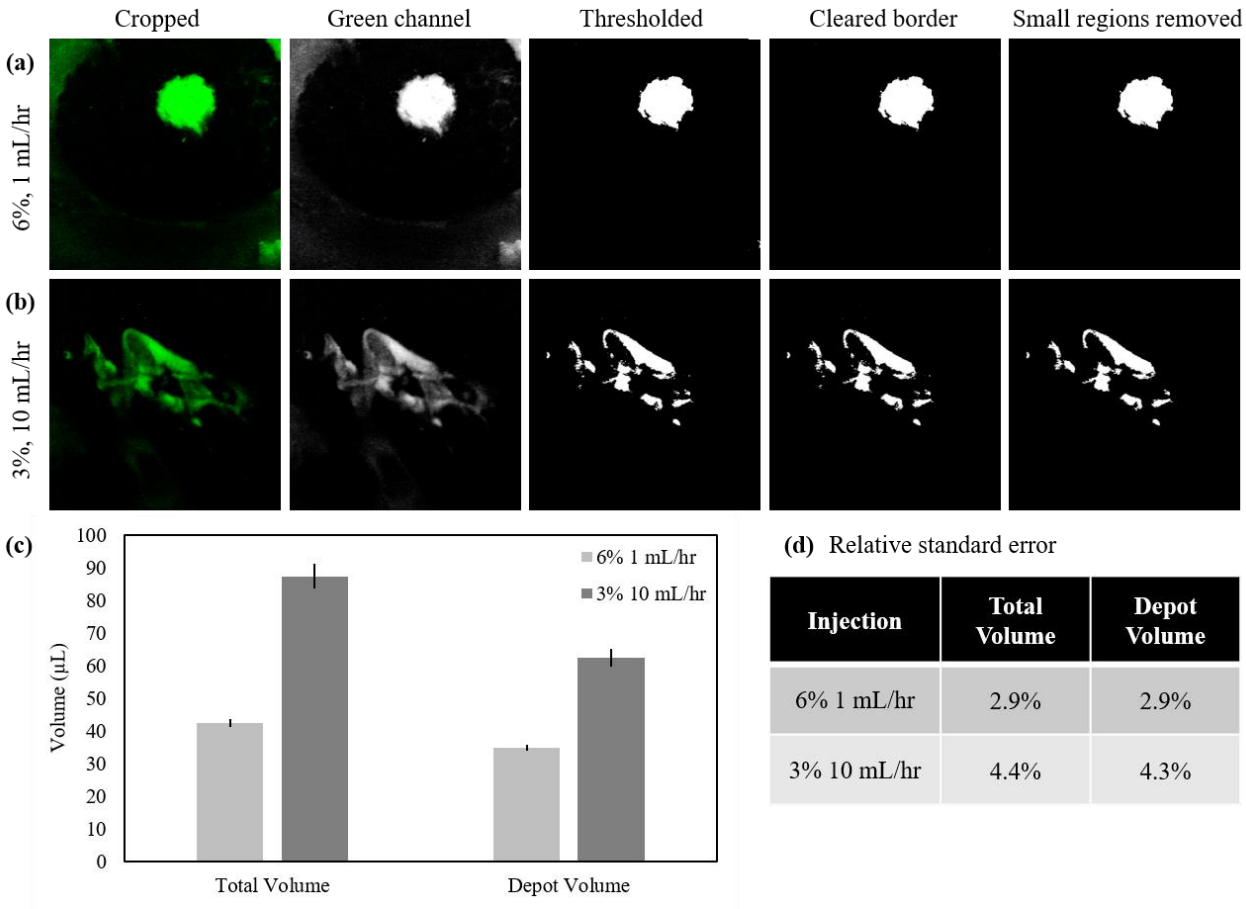


Fig. S2. Optimization of fluorescein concentration for visualizing distribution volumes. (a) 6% ethyl cellulose (EC)-ethanol solutions were made with a range of fluorescein concentrations (0.15% to 2% w/v). 1 mL of each solution was poured into a petri dish and then imaged with the fluorescent Pocket colposcope. (b) The average intensity in the green channel of the image was quantified indicating that 0.25% (w/v) fluorescein maximized image intensity. (c) 0.25% fluorescein can be easily visualized in tissue and correlates with the volume seen in the bright light reflectance image.



(d) Relative standard error

Injection	Total Volume	Depot Volume
6% 1 mL/hr	2.9%	2.9%
3% 10 mL/hr	4.4%	4.3%

Fig. S3. Image processing to quantify distribution volume. Representative images of (a) 6% ethyl cellulose injection at 1 mL/hr and (b) 3% ethyl cellulose injection at 10 mL/hr are shown illustrate the algorithm. First the image was cropped, and the green channel was thresholded to isolate the fluorescein signal. Then the border was cleared and small regions were deleted to remove noise. (c) Repeated analysis (n=5) of representative injections indicates small deviations in total volume and depot volume and (d) relative standard errors (standard error/mean*100) below 5%.

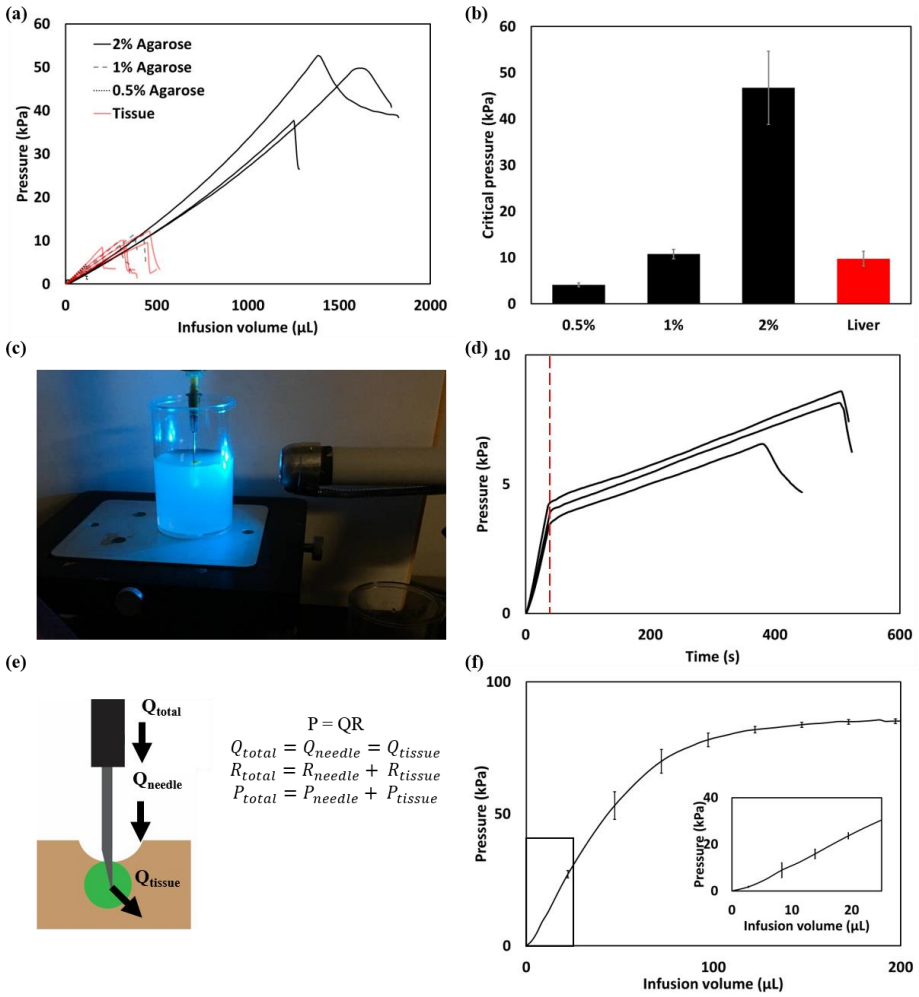


Fig. S4. (a) Critical pressure is defined as the maximum pressure achieved by infusing air into either agarose or tissue at a rate of 10 mL/hr. (b) 1% agarose has a critical pressure most similar to *ex vivo* liver tissue. (c) Fluorescein visualization was enhanced by illuminating it with a blue light. (d) Similar to air, exceeding the critical pressure during infusion of ethyl cellulose-ethanol leads to a drop in the post-infusion pressure. Given the narrow needle diameter used in this study, the infusion rate must be reduced to observe the decrease in pressure. The infusion began at a rate of 1 mL/hr (to the left of the red dotted line) and then was decreased to 0.1 mL/hr. (e) The pressure measured during the infusion (P_{total}) is dictated both by the resistance to fluid flow imposed by both the needle (P_{needle}) and tissue (P_{tissue}). To estimate the pressure experience by the tissue, treating these sources of resistance are approximated as resistors in parallel. (f). During infusions into air (where R_{tissue} = 0), the pressure increases with infusion volume until approximately 100 µL. Because of this, the measured critical pressure increases with the infusion volume until approximately 100 µL.

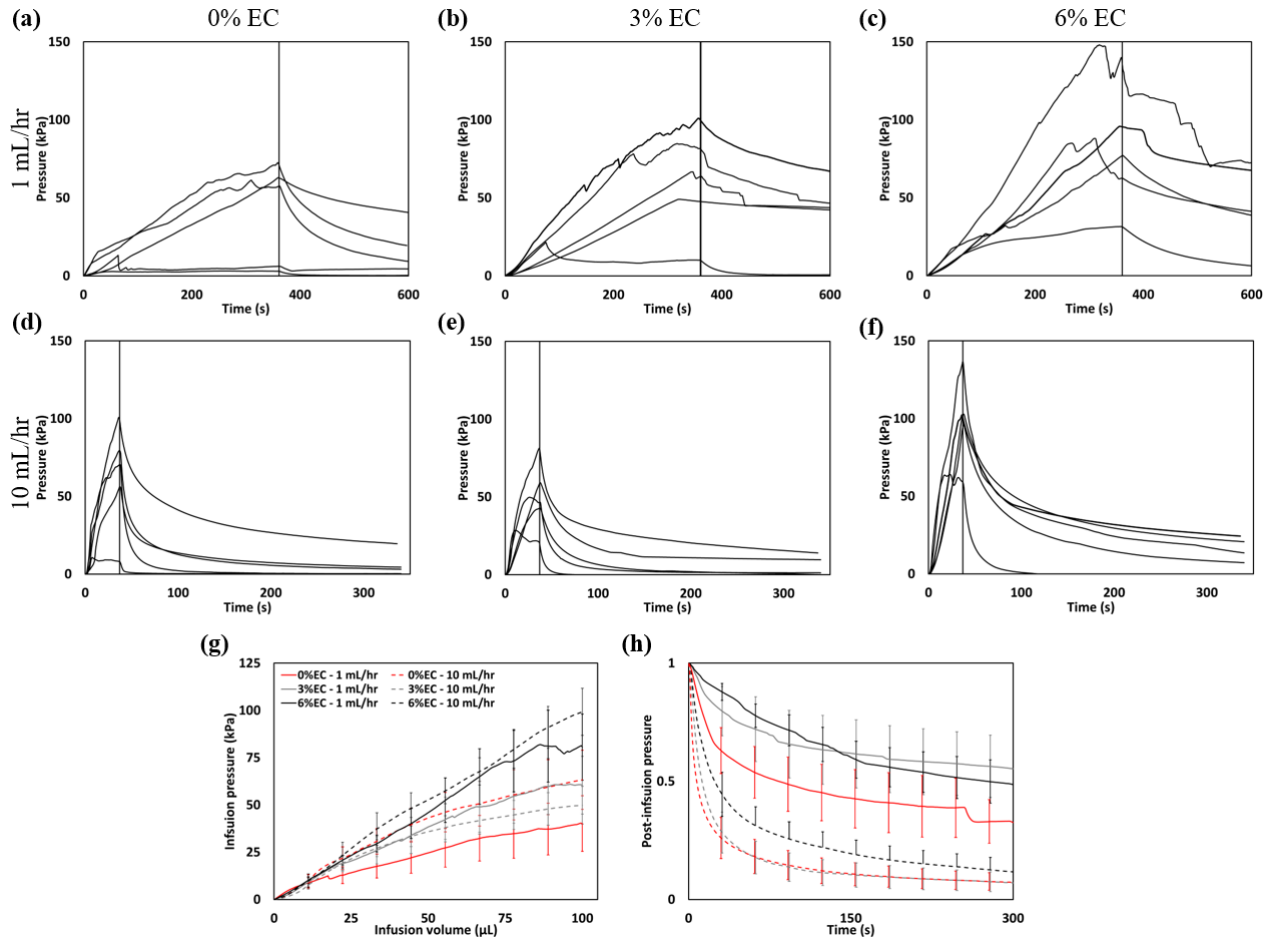


Fig. S5. Pressure profiles for 1 mL/hr infusions of pure ethanol (a), 3% ethyl cellulose-ethanol (b), and 6% ethyl cellulose-ethanol (c) and for 10 mL/hr infusions of pure ethanol (d), 3% ethyl cellulose-ethanol (e), and 6% ethyl cellulose-ethanol (f). The black vertical line denotes the end of the infusion phase. The pressure during the infusion phase (g) and the normalized post-infusion pressure (h) are plotted for each group.

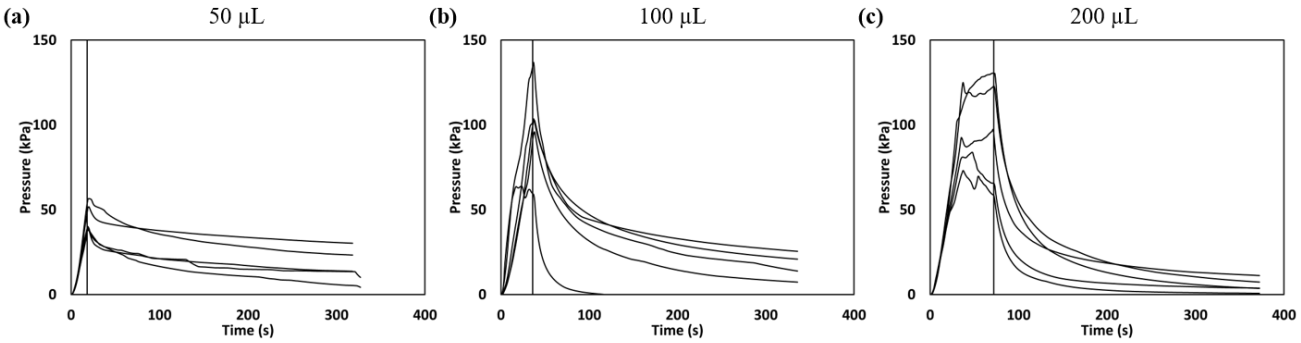


Fig. S6. Total pressure curves for 6% EC-ethanol infused at a rate of 10 mL/hr and an infusion volume of 50 (a), 100 (b) and 200 (c) µL. The black vertical line denotes the end of the infusion. Pressure was measured for 300 seconds after the infusion.