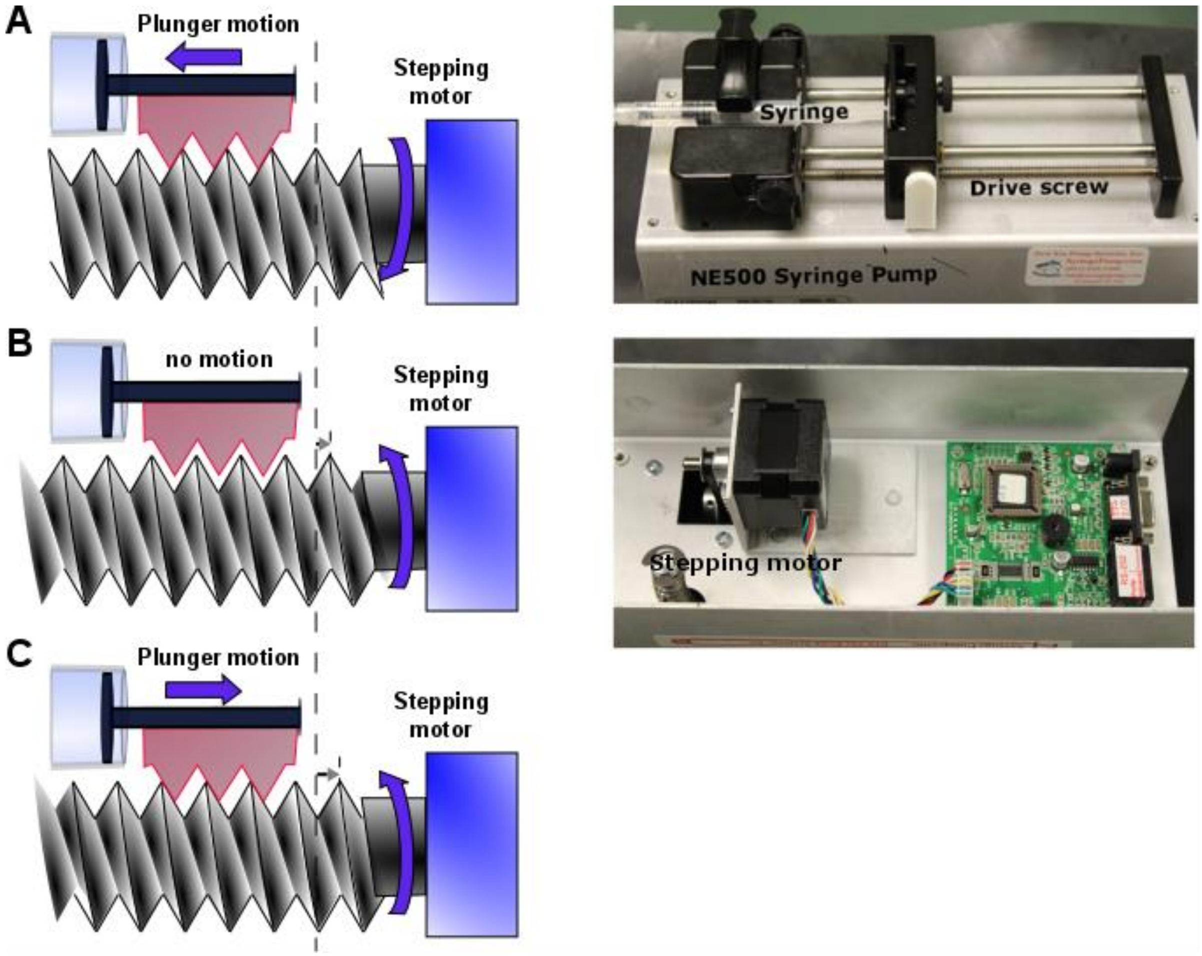
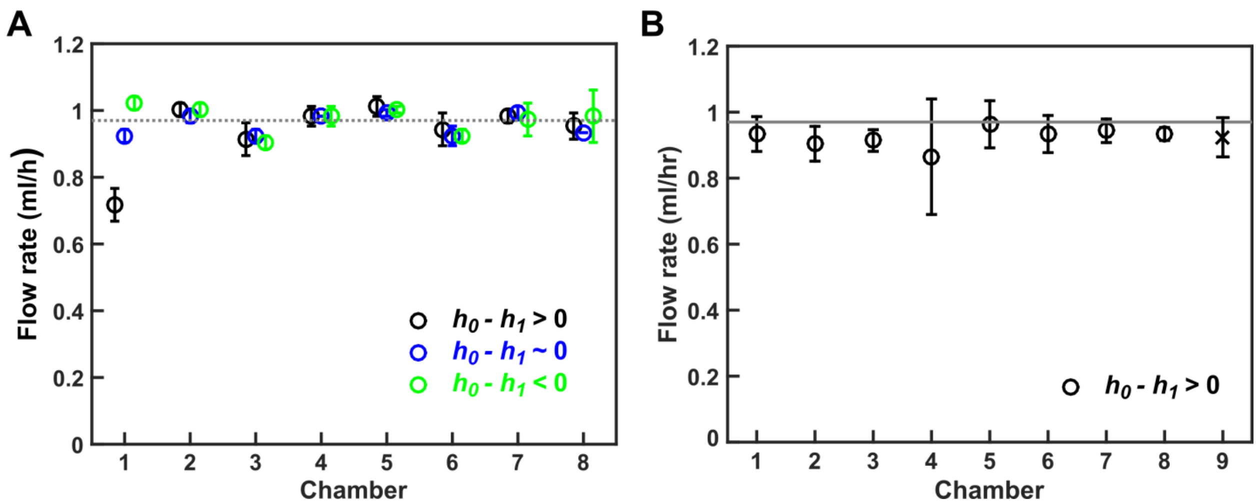
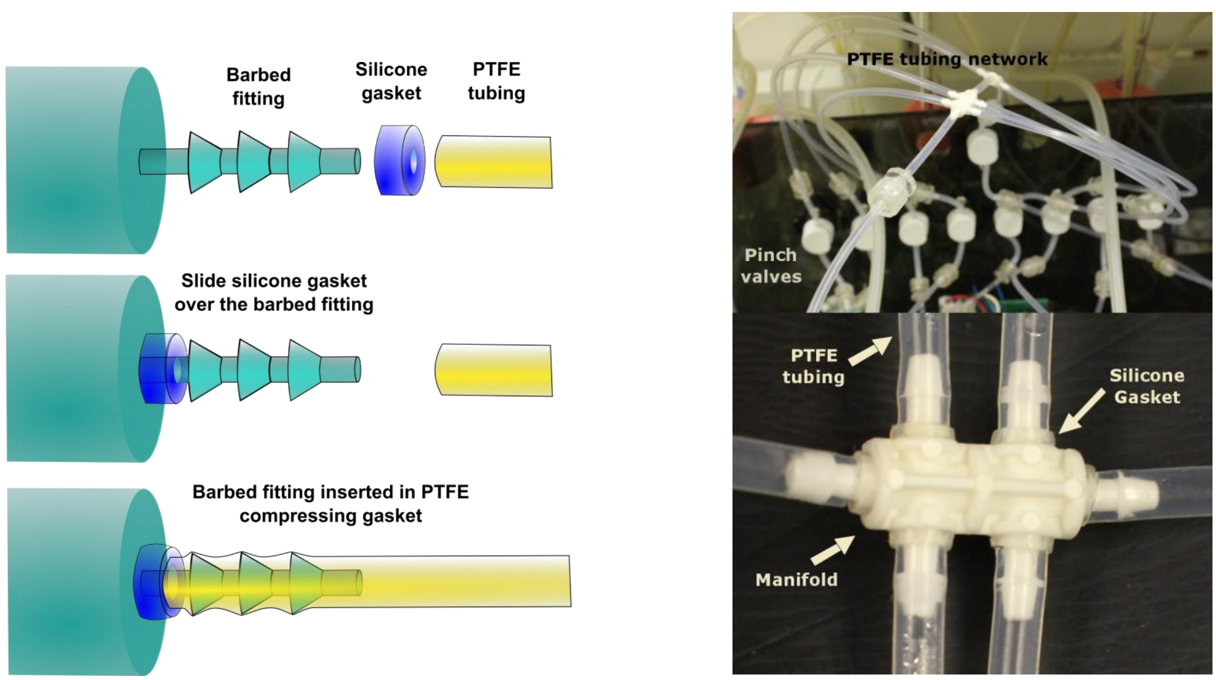


Supplementary Figure S1. Pump backlash

The syringe pump uses a stepping motor and a threaded drive rod to move the syringe plunger. Backlash is defined here as the maximum turning of stepping motor which does not lead to plunger movement. (**A**) Counter-clockwise turning of stepping motor (viewed from the right-hand side) drives plunger to move left. (**B**) When the direction of turning is reversed, the threads of the plunger holder are detached from the threads of the motor drive screw. Thus, even as the motor turns, the plunger does not move. This is the backlash. (**C**) Re-engagement between plunger and stepping motor leads to plunger motion. Long dashed line marks a reference position, and short dotted lines mark one tooth of the stepping motor. ~0.2 mL was used for backlash correction volume.

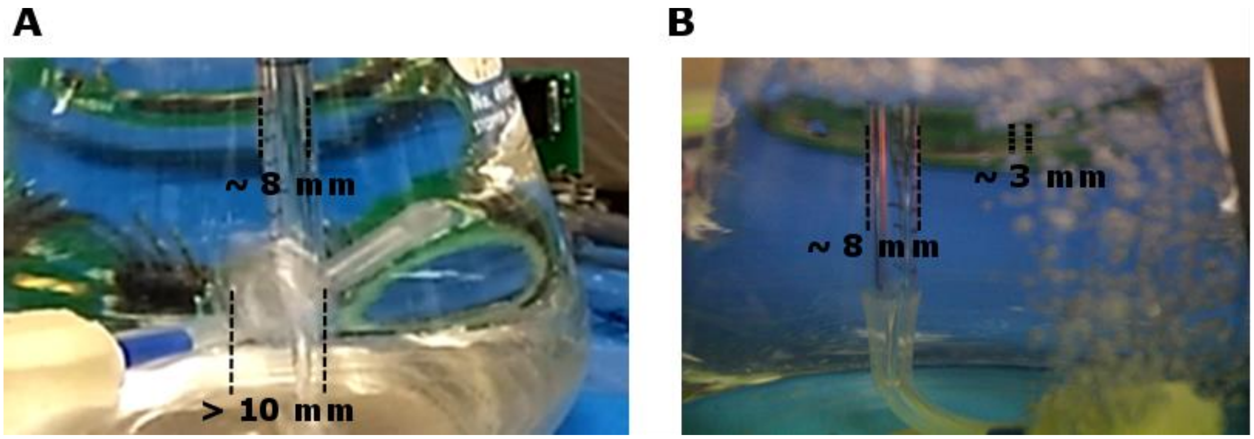


Supplementary Figure S2. Variable flow rate in first chamber when using silicone tubing.
(**A**) Depending on the liquid level of reservoir (h_0, which changes during the course of an experiment) and the liquid level of media input to Chamber 1 (h_1), the first dispense (which is to Chamber 1) might deviate from the target (grey line). Chambers 2 to 8 are much less affected. (**B**) When we cycle the order of dispense (Fig 6A) for the case h_0- h_1>0, the large flow rate deficit originally observed for chamber 1 now averages out among all eight chambers, showing that the deficit is a property of the first dispense instead of the location of a particular chamber in the setup. For all flow rates, data point for each chamber represents 5 trials, with error bars indicating two standard deviations. The cross in **B** marks the average flow rate of eight chambers, with the error bar indicating two standard deviations.



Supplementary Figure S3. Silicone gasket assembly.

To prevent leaks from the junction of rigid PTFE tubing with the barbed fittings of manifolds, we added a small silicone gasket. Because we could not find commercial sources for such small silicone gaskets, we cut approximately 1mm sections of silicone tubing (1/16" ID 1/8" OD from VWR International) with a single edged razor blade. The silicone gasket is placed over the barbed fitting, and the fitting is inserted into the tubing, pressing the end of the tubing against the gasket, thus forming a flexible seal. Silicone gasket assembly allows at least five cycles of autoclaving without leakage.



Supplementary Figure S4. Aquarium stone reduces bubble size and potentially increases the humidity of air in the bubble

Air exits from the end of a pipet (~8 mm diameter for comparison), forming bubbles of >10 mm diameter without an aquarium stone (**A**), or of ~3 mm diameter with an aquarium stone (**B**). The large bubbles are in the liquid for around 1/3 second. Given the diffusivity of water in air, $D \approx 2.8 \times 10^{-5}$ m^2/s, and assuming a characteristic bubble radius of 5 mm, we can calculate a crude estimate (an upper bound) for the time for water molecules to diffuse to the center of the bubble $R^2/D = (0.005m)^2/2.8 \times 10^{-5}\ m^2/s = 0.9$ s. This estimate shows that there may be inadequate time for a large bubble to become saturated with moisture. The diameter of bubbles from the bubbler stone is typically less than 3mm. This gives a timescale for saturation of $R^2/D = 0.04s << 0.9$ s, which may be responsible for a reduction in evaporation when using aquarium stone (Figure 2D).