Supplementary Information

As shown in Figure S1, when the pressure is applied in the syringe by the plunger, it is evenly distributed to the rubber packing and thus, the rubber packing moves while maintaining the original, inverted bowl shape. However, when the rubber packing in the lower position reaches the underside of the syringe, it cannot move any further and thus, the pressure is concentrated on the center of the rubber packing, deforming the shape of the rubber packing. Importantly, the small hole at the center of the rubber packing is widened, discharging the solution in the lower compartment (yellow color). When the pressure continues to apply, all the solution in the lower compartment (yellow color) is discharged and the rubber packing in the upper position moves while maintaining the original, inverted bowl shape. In the same manner with the rubber packing in the lower position, when the rubber packing in the upper position also reaches the underside of the syringe, the shape of the rubber packing is deformed and the solution in the upper compartment (green color) is discharged.

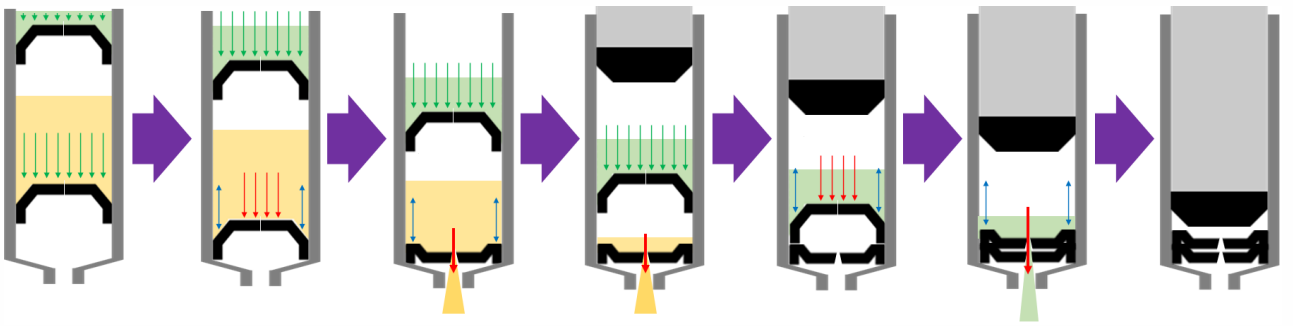

Figure S1. The operational procedure showing how different solutions are sequentially dispensed. Green, red, and blue arrows indicate the pressure uniformly distributed over the rubber packing, the pressure concentrated on the center of the rugger packing, and the pressure that does not applied on the rubber packing, respectively.