ARTICLE

Supplementary information

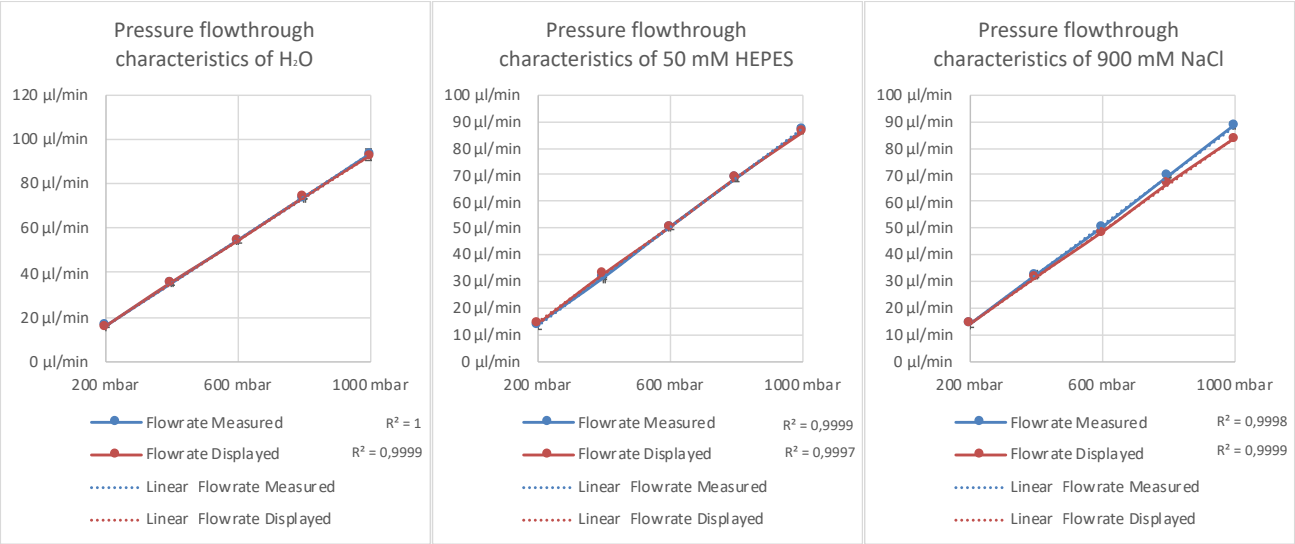
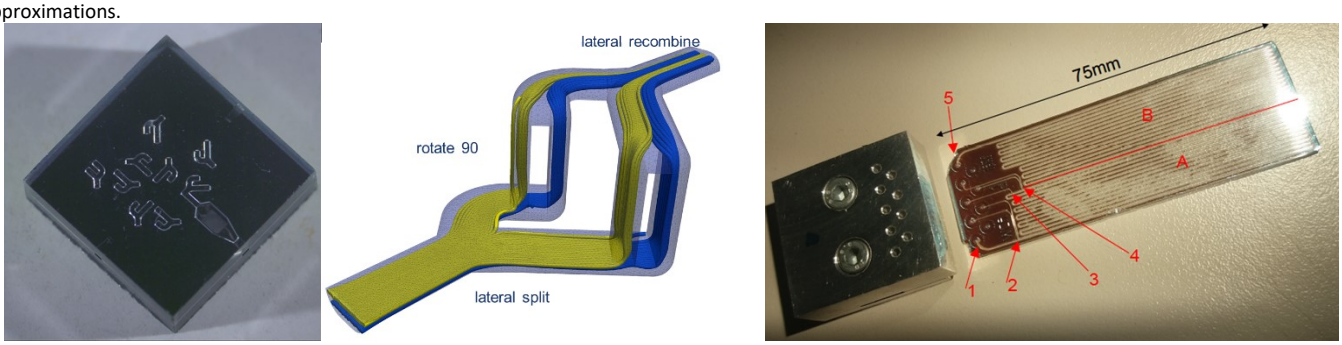


Fig. 1: Pressure flow through characteristics of biochemically relevant solutions for the CP150C capsid assembly assay in flow. Depicted are the measured values generated by collecting the flow through in the system (blue) and the values displayed by the flow measure units (red) with the respective linear approximations.



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Lamella	Lamellas´ size orthogonal to flow direction (mm)	Time required for complete mixing (s)
1	7.50E-02	3.44E+00
2	3.75E-02	8.61E-01
3	1.88E-02	2.15E-01
4	9.38E-03	5.38E-02
5	4.69E-03	1.34E-02
6	2.34E-03	3.36E-03
7	1.17E-03	8.40E-04
8	5.86E-04	2.10E-04
9	2.93E-04	5.25E-05

Fig. 2: Microreactors used for the CP150-BO capsid assembly assay. On the left, the mixing unit ROSAR GF-T75; Split-and-Recombine technology-based (middle figure) microreactor is depicted with the respective chip holder. On the right, the WCA1b is used to increase the residence time of the reaction, with a channel

size of 40 x 150 µm and a length of 2553 mm. Bottom table depicts the mixing efficiency of ROSAR GF-T75 with respect to lamellas'size and time required for mixing.

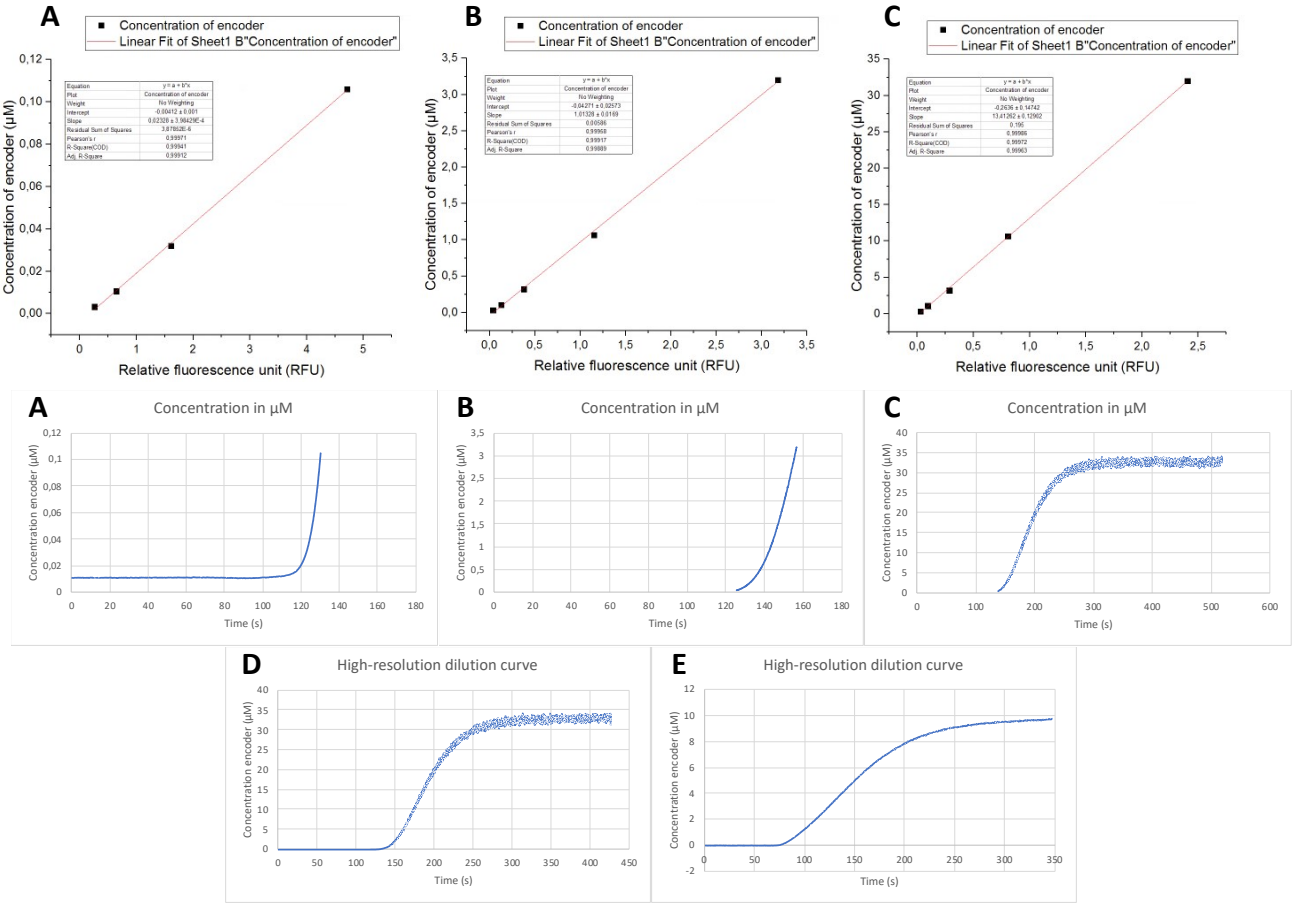


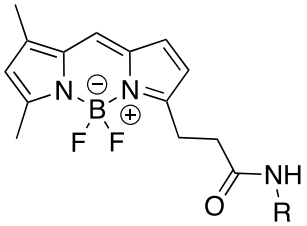
Fig. 3: Generation of the high-resolution encoder curves at residence times of 3 min (D) and 51 s (E) using a solution of 32 µM sodium fluorescein. A single high-resolution curve is composed of three independent ones with three technical replicates, representing low (A), middle (B), and high concentrations (C), respectively. The RFU of was converted to compound concentrations using calibration curves.

Table 1: PFA tubing used for the characterization of convection-dominated TAD-mediated compound dilution.

Tubing specification	ID (mm)	Length of tubing (cm)	Volume of the tubing (µl)	L/R ratio	Peclet number (D based on FITC)	Distance traveled until mixing by diffusion (cm) (Pe x ID)
PTFE, 2.0 x 1.70 mm / JR-T-6801-M3 / Analytic Shop	1.70	4.86	117.00	27.80	273.44	46.5
PFA, 1/16 x 1.0 mm ID; JR-T-4007-M3 / Analytic Shop	1.00	14.90	117.00	148.97	156.25	15.6
PFA, 1/16 x 1.0 mm ID; JR-T-4007-M3 / Analytic Shop	1.00	10.00	78.54	100.00	156.25	15.6
PFA, 1/16 x 1.0 mm ID; JR-T-4007-M3 / Analytic Shop	1.00	5.00	39.27	50.00	156.25	15.6
PFA, 1/16 x 1.0 mm ID; JR-T-4007-M3 / Analytic Shop	1.00	2.50	19.63	25.00	156.25	15.6
PFA, 1/16 x0.75 mm ID; JR-T-4002-M3 / Analytic Shop	0.75	26.48	117.00	353.11	117.19	8.8
PFA, 1/16 x0.50 mm ID; JR-T-4001-M3 / Analytic Shop	0.50	59.59	117.00	1191.75	78.13	3.9
PEEK-Tubing 1/16" OD x 0.25 mm ID	0.25	238.35	117.00	9534.02	39.06	1.0
PFA, 0.2mm id. 1.6mm od; AGG1833-65573 / Analytic Shop	0.20	372.42	117.00	18621.13	31.25	0.6
PEEK-Tubing 1/16" OD x 0.13 mm ID; SCP 41.159.013.01	0.13	881.47	117.00	67805.66	20.31	0.3

Table 2: BODIPY derivatives with increasing molar mass used for the characterization of convection-dominated TAD.

Compound names	-R	Molar mass (g/mol)
B-01	H	291.16
B-02		335.19
B-03		363.23
B-04		391.27
B-05		419.31
B-06		447.35
B-07		475.39



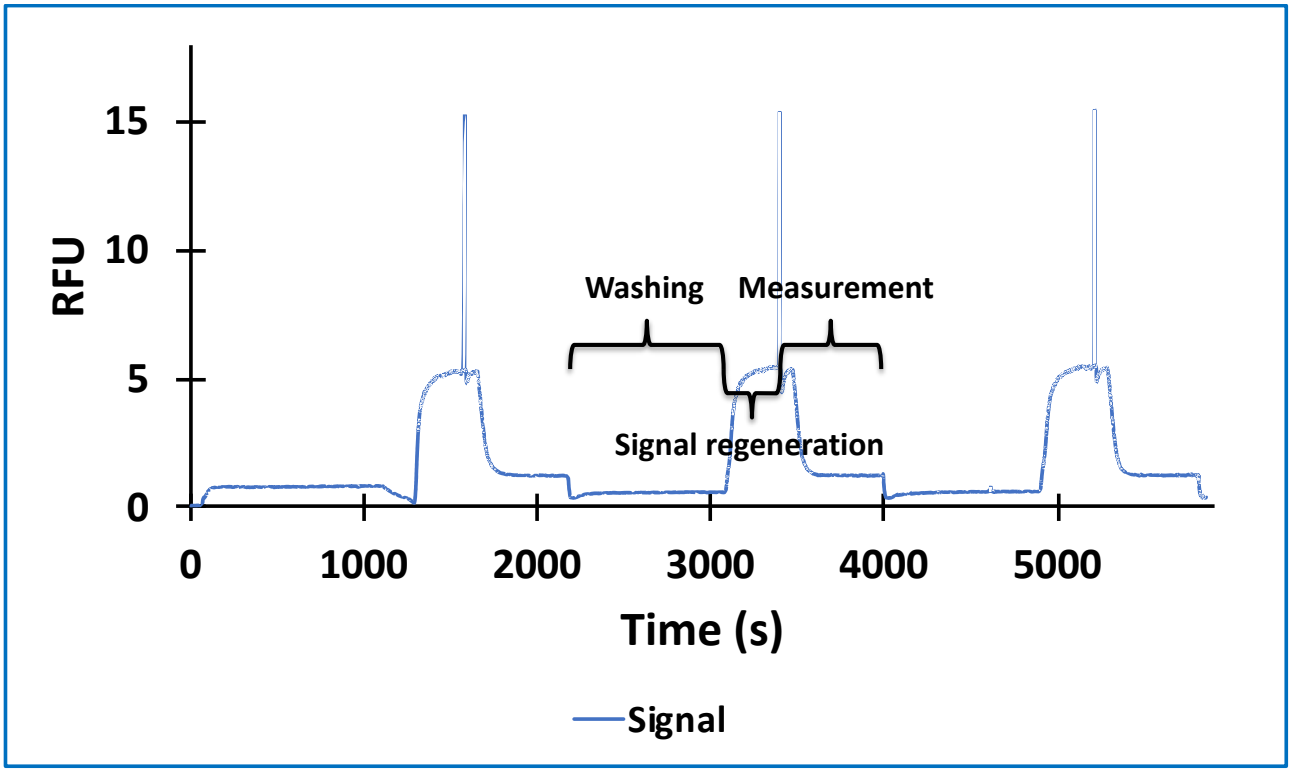


Fig. 4: Measurement of 32 µM BAY 41-4109-mediated CP150C assembly at 51 seconds post-mixing. Depicted are three measurements with washing, signal regeneration and measurement parts, respectively.

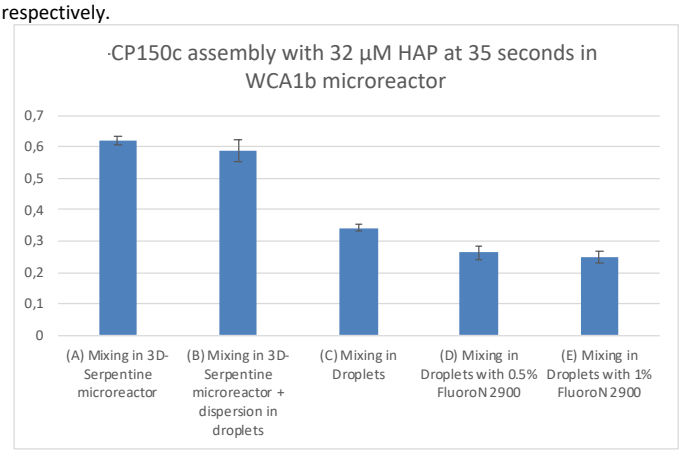


Fig. 5: Measurement of 32 µM BAY 41-4109-mediated CP150C assembly at 35 seconds post-mixing in the WCA1B microreactor. Mixing in continuous flow format with the 3D-Serpentine microreactor reached 60 % CP150-BO assembly (A). On the other, hand mixing in droplets (C) in the continuous phase of FC770 + 2.4% PFPE-PEG-PFPE resulted in an assembly of under 35% and was not improved by adding FluoroN2900 to the continuous phase (D, E). Premixing the protein with the compound, followed by the dispersion in droplets (B) resulted in an assembly close to the continuous flow format indicating that the assembly reaction is impaired in droplets.