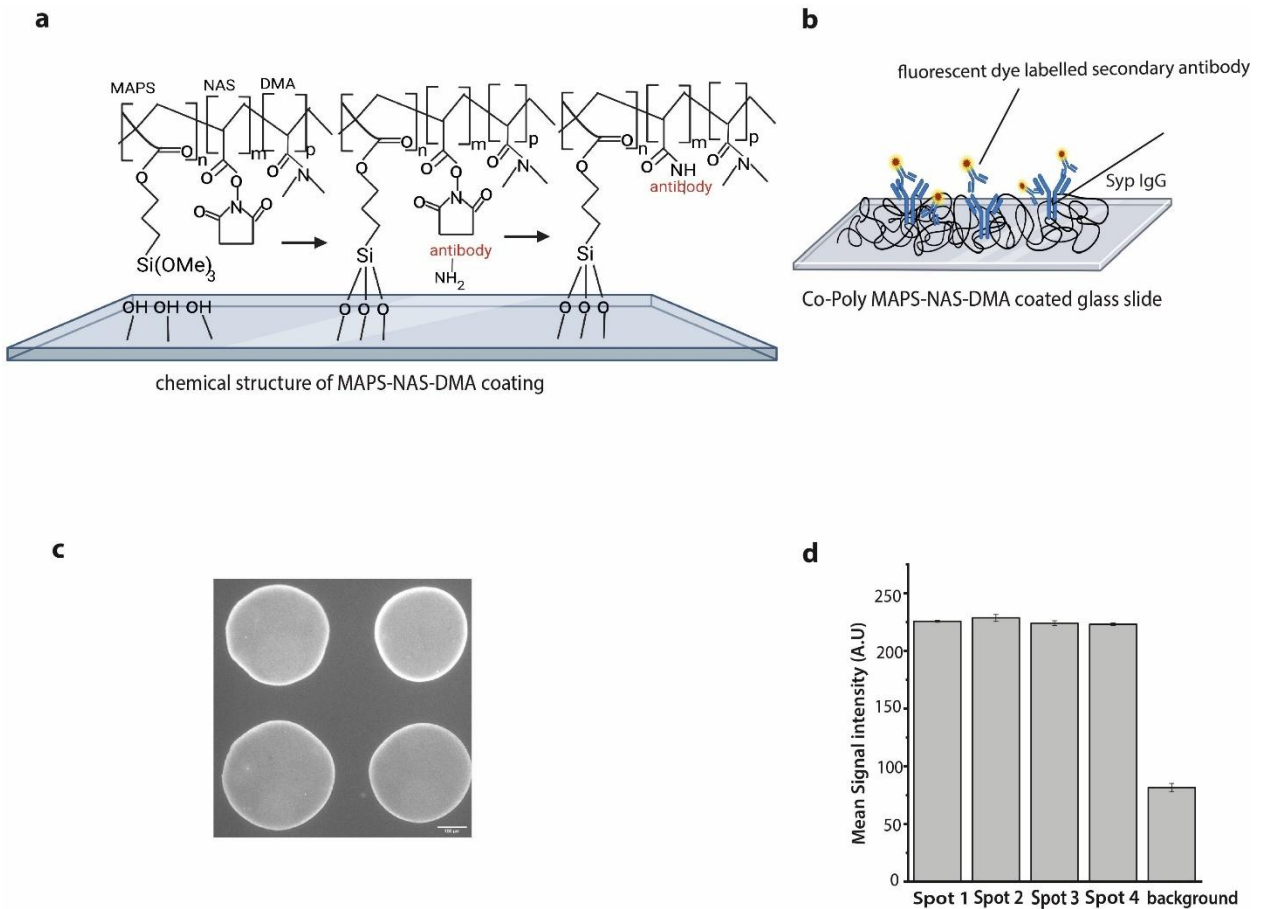


Supplementary figures

Supplementary Fig. 1:



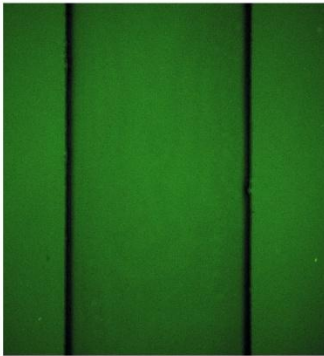
Immobilization of purified antibodies (IgG) on glass slides functionalized with copolymer.

a: Diagram depicting the structure of the copolymer and its covalent attachment to glass with the functional maleimide groups that are used for coupling of the antibodies via free amino groups

b – d: Labelling of immobilized anti-synaptophysin antibodies with a goat anti-mouse IgG labeled with Alexa Fluor 488 (Invitrogen, A32723, Thermo-Fisher). **b** gives an overview over the experiment. **c:** Microscopic image of a segment of the spotted antibody pattern, showing strong labelling of the spotted area, with a fluorescent intensity more than twofold over background (**d**).

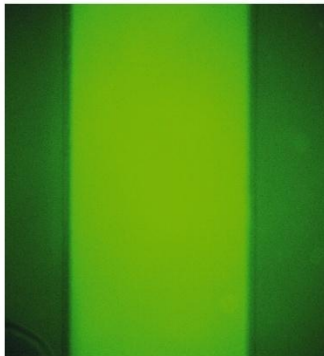
15 **Supplementary Fig 2:**

a



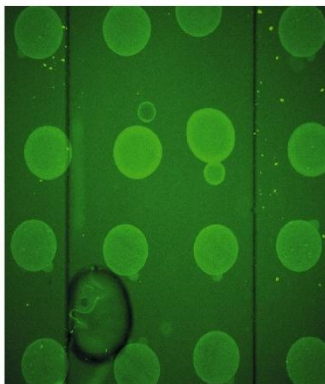
view of the channel
before loading

b



view during superfusion
with brain extract
containing spH-SVs

c



view after rinsing
with phosphate-
buffered saline

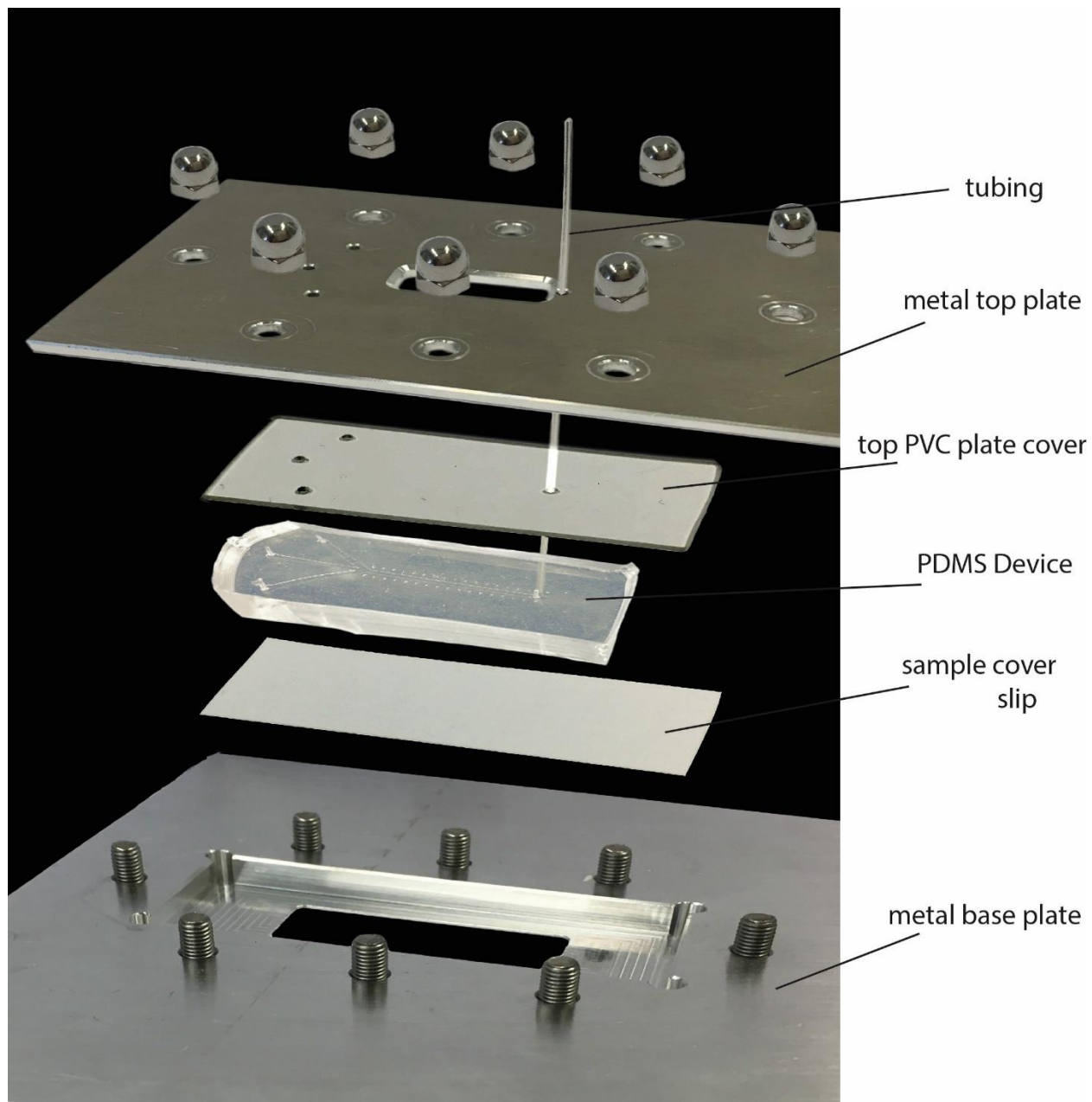
16

17 Immunocapture of SVs (obtained from transgenic mice expressing synaptopHluorin) by superfusion with
18 brain extract after assembly of the device. After rinsing with PBS, the slide was superfused with mouse
19 brain extract for 30 min, followed by rinsing with PBS. The picture shows a part of the channel at low
20 magnification.

21

22

23 **Supplementary Fig. 3:**



Exploded diagram of the assembled mounting device

28 **Supplementary file:**

29

30 Detailed construction plan for the plates of the mounting device, provided by the Instrument Shop of
31 the Max-Planck-Institute for Multidisciplinary Science's, Göttingen.

32

33

34 **Supplementary movies**

35 Supplementary movie 1:

36

37

38 Simulation of the transport of a diluted species over time in a microfluidic device with an anti-
39 symmetric, rectangular flow profile (minimum flow: 0.001 m/s, maximum flow 0.025 m/s) applied to
40 side inlet 1 and side inlet 2. The movie displays the concentration of the species flowing into side inlet 1.
41 The gray box indicates the region shown in the experimental realization (supplementary movie 2).

42

43 Supplementary movie 2:

44

45 Time-lapse epi-fluorescence microscopy showing flowing fluorescein during switching flow. The movie
46 shows laminar flow across the main channel under rectangular flow defined by the user injection of
47 fluorescein. Images were acquired every 3.2 ms. The video is only a section of the channel (see gray box
48 in the simulation (supplementary movie 1). Scale bar and timestamps are shown in the video.

49

