

Oct 28, 2025

## Cover glass silanization and preparation of flow chambers

DOI

<https://dx.doi.org/10.17504/protocols.io.n92ld6ny7g5b/v1>

Sofia Galkina<sup>1,2</sup>, Fedor A. Balabin<sup>1</sup>, Anastasia N. Sveshnikova<sup>1,2</sup>

<sup>1</sup>Center for Theoretical Problems of Physico-Chemical Pharmacology, Russian Academy of Sciences, Moscow, Russia;

<sup>2</sup>National Medical Research Center of Pediatric Hematology, Oncology and Immunology named after Dmitry Rogachev, Moscow, Russia



Sofia V. Galkina

### Create & collaborate more with a free account

Edit and publish protocols, collaborate in communities, share insights through comments, and track progress with run records.

Create free account

OPEN  ACCESS



**DOI:** <https://dx.doi.org/10.17504/protocols.io.n92ld6ny7g5b/v1>

**Protocol Citation:** Sofia Galkina, Fedor A. Balabin, Anastasia N. Sveshnikova 2025. Cover glass silanization and preparation of flow chambers. protocols.io <https://dx.doi.org/10.17504/protocols.io.n92ld6ny7g5b/v1>

**License:** This is an open access protocol distributed under the terms of the **Creative Commons Attribution License**, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited



**Protocol status:** Working

**Created:** October 15, 2025

**Last Modified:** October 28, 2025

**Protocol Integer ID:** 229883

**Keywords:** preparation of flow chamber, cover glass silanization, flow chamber, capturing platelet, antibody, blood flow, adhesive coating, silanized cover slip, silanization

**Funders Acknowledgements:**

Russian Science Foundation

Grant ID: 23-45-10039

## Abstract

We used silanized cover slips in our flow chambers to immobilize antibodies. Plain cover slips showed less effective results. Antibodies act as anchors, capturing platelets from a blood flow simulated within the flow chamber. The adhesive coating ensures that cells remain in place, allowing for the detection of a fluorescent signal.

## Materials

### Cover glass silanization:

1. 24 × 50 mm glass coverslip (D102450, DeltaLab, Barcelona, Spain)
2. Ceramic glass holders suitable for plasma cleaner (8542E40, Thomas Scientific, Swedesboro, NJ, USA)
3. Plastic glass holders suitable for placement into trichloroethylene (\*)
4. Two 250 ml glass cylinders that fit ceramic glass holders loaded with coverslips
5. Ultrasonic bath that fits two 250ml glass cylinders
6. 750 ml closable bath that fits plastic glass holders filled with coverslips
7. 1.5l Isopropanol
8. PlasmaFlo plasma cleaner Plasma Cleaner PDC-32G, PlasmaFlo PDC-FMG (Harrick Plasma, Ithaca, NY, USA)
9. 500 ml trichloroethylene (Komponent-Reaktiv, Moscow, Russia)
10. 250 µl Dichlorodimethylsilane (440272-1L, Sigma)
11. 1 ml single-use syringe
12. Fine glass cutter
13. Fiber optic wipes (F16705, FIS, Oriskany, NY, USA)

(\*) We used custom-made fluoroplastic holders, but many others are commercially available.

### Preparation of flow chambers:

1. 25 × 75 × 1.2 mm glass slides (ApexLab, Moscow, Russia)
2. A micro drill equipped with a 1.3 mm diamond-coated tubular drill bit.
3. Silicone tube with an outer diameter of 1.5 mm and inner diameter of 0.5 mm cut into 12 cm pieces (MedSil, Mytisch, Russia).
4. Hot melt adhesive and a glue gun
5. Dual-side 0.2 mm-thick adhesive tape (3M 467, Maplewood, MN, USA, or analog)
6. Silanized glass (see above for details)
7. Fine tweezers
8. Scalpel and utility paper-cutting knives
9. Fiber optic wipes (Kimberly-Klark Professional, Milsons Point, NSW, Australia)

## Safety warnings

- ! Any manipulations with dichlorosilane require special care and good ventilation. Dispose of used dichlorodimethylsilane solution under local regulations on hazardous compounds.



## Cover glass silanization

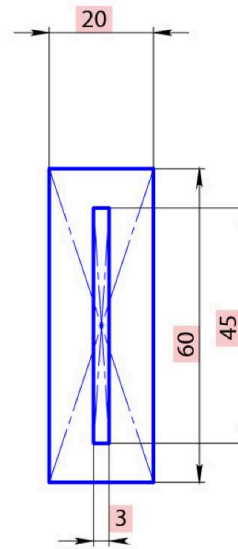
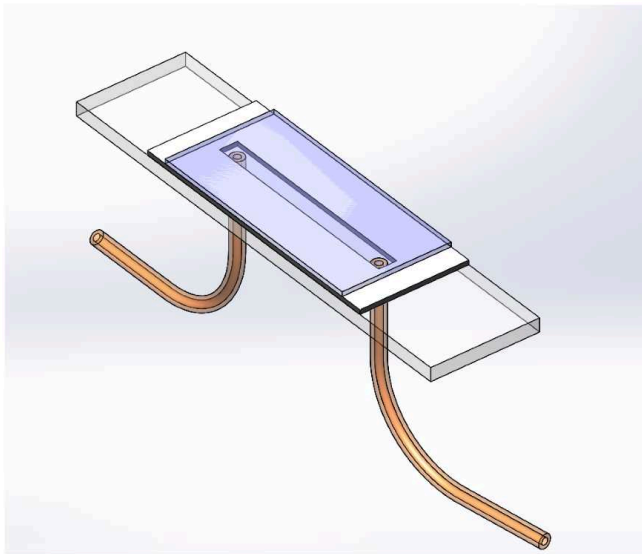
1h 40m

- 1 Place the coverslips into ceramic holders. 5m
- 2 Fill glass cylinders with 250 ml of isopropanol, place holders inside and sonicate in ultrasonic bath for 5 minutes. 5m
- 3 Take holders out and let the coverslips dry in the clean air. 5m
- 4 Place the bath under a laboratory fume hood. Pour in 500 ml of trichloroethylene, add 250 µl of dichlorosilane, and stir. Close the bath tightly to prevent evaporation. 5m 
- 5 Clean the coverslips in the plasma cleaner according to its protocol. 20m
- 6 Move the coverslips into the plastic holders (suitable for placement into trichloroethylene). 5m
- 7 Put the plastic holders in the bath. Close the bath tightly and incubate the coverslips for 30 minutes 30m
- 8 Sonicate silanized coverslips in isopropanol for 5 minutes. 5m
- 9 Wash the coverslips 3 times in isopropanol and 7 times in dH<sub>2</sub>O. 10m
- 10 Dry the coverslips and cut them into two equal pieces along the longer side. Store them with fiber optic wipes as interlayer. 10m

## Preparation of flow chambers

34m

- 11 Drill two 1.3mm diameter holes in the glass slide, 42mm apart. 10m



Left image: visualization of the assembled flow chamber

Right image: parameters (in mm) of an adhesive spacer between the coverslip and the glass slide with a cut-out channel for liquid flow. The spacer is cut from the adhesive tape.

- 12 Wash the drilled slide with tap water and then wipe with isopropanol. 3m
- 13 Push the ends of the silicon tubes into the holes so they go approximately 1 cm beyond the surface of the slide. 30s
- 14 Fix the tubes on the slide by applying the hot melt adhesive on the side of the slide with longer tube ends. Apply the adhesive all around the tube to ensure good fixation and sealing. 10m
- 15 Cut the short ends of the tubes flush to the slide. 30s
- 16 Cut the spacer from adhesive tape using an utility knife, following the geometry shown in the picture above. 5m
- 17 Place it on the slide so that the holes fit into the channel in the spacer. Use a plastic spudger to squeeze the air from the tape. 1m



- 18 Place silanized glass on the other side of the tape and squeeze the air from the place of contact again. 1m
- 19 Cover up the sides of silanized glass with quick-drying varnish to ensure good sealing. 3m
- 20 Store the assembled chambers in a dark, dry place.