

PROTOCOL EXCHANGE | COMMUNITY CONTRIBUTED Microfluidic device design, fabrication, and testing protocols

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Abstract

This protocols document describes the design considerations and software tools to design a microfluidic device, fabrication protocols for making master molds and the final polydimethylsiloxane (PDMS) device, and testing of the completed microfluidic device.

Subject terms: **Cell biology** **Isolation, Purification and Separation** **Microbiology**

Keywords: **microfluidic device** **microfabrication**

Introduction

Microfluidic devices are often used to perform biological assays. They have been used for functions that include to trap¹, deform² and sort³ cells. To make these tools we use fabrication processes adopted from the integrated circuit manufacturing industry to first make a master mold and using this master mold we make a complete device.⁴ The procedure to fabricate a master and corresponding microfluidic device is shown by the schematics in Figure 1 (See attachment "Protocols document").

The purpose of this document is to provide guidelines for first time users. This will help the reader understand what is needed to take an idea for a device through the design and fabrication process to make a complete device for testing. Section 1 presents microfluidic device design using AutoCAD. Section 2 describes the master fabrication steps (Figure 1.1-1.3). Section 3 provides the procedure to use polydimethylsiloxane (PDMS) to fabricate the finalized microfluidic device (Figure 1.4-1.5). Section 4 discusses the methods used to test the devices.

Procedure

See attachment "Protocols document."

Timing

Master fabrication: 3-4 hours excluding device characterization

Device fabrication: 1-2 hours excluding 4 hour bake step

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Figures

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Competing financial interests

The authors declare no competing financial interests.

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