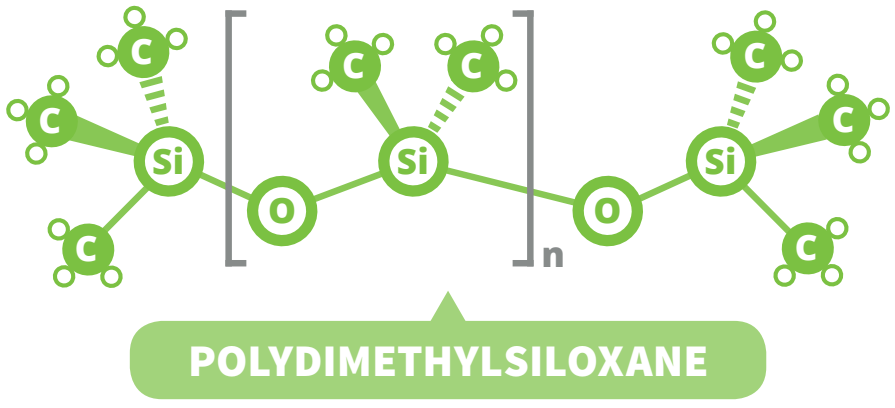
DEVELOPING CHEAPER LAB-ON-A-CHIP DEVICES WITH 3D PRINTING

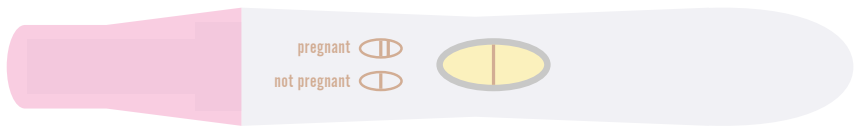
WHAT IS A LAB-ON-A-CHIP?

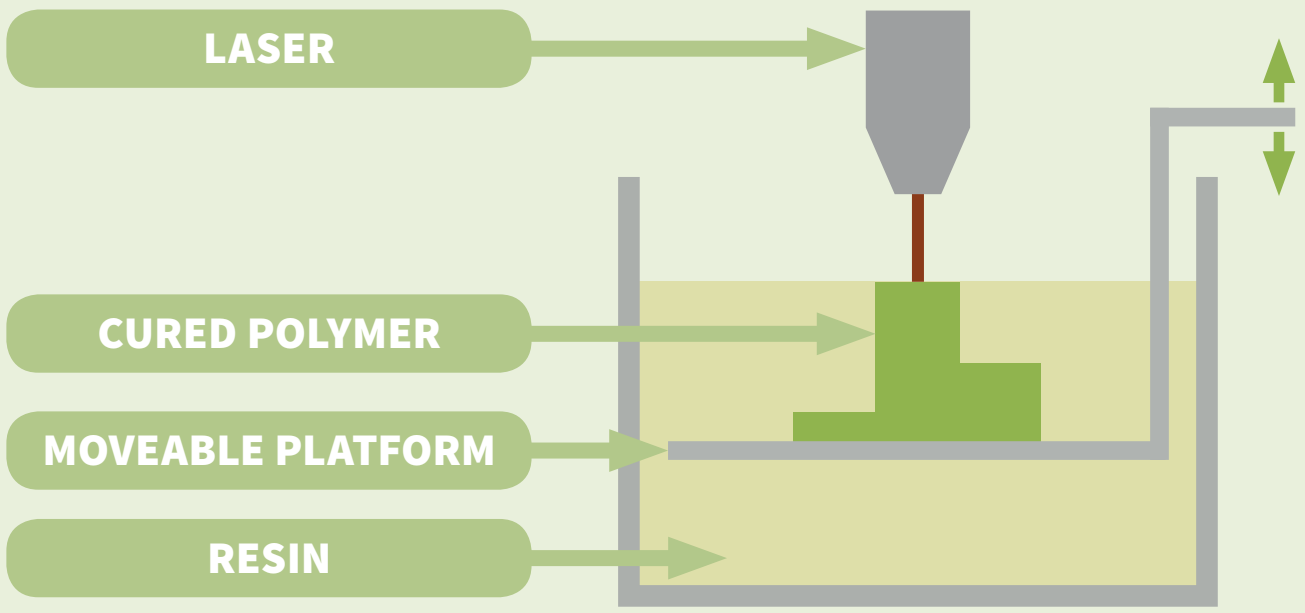
A lab-on-a-chip (LOC) is a small handheld device that is able to carry out tasks that usually require a laboratory. Everyday examples include diabetic blood glucose tests and home pregnancy tests.

However, current LOC design is time-consuming and restrictive. Most are made by forming individual layers of polydimethylsiloxane (PDMS) and bonding them together.



POLYDIMETHYLSILOXANE

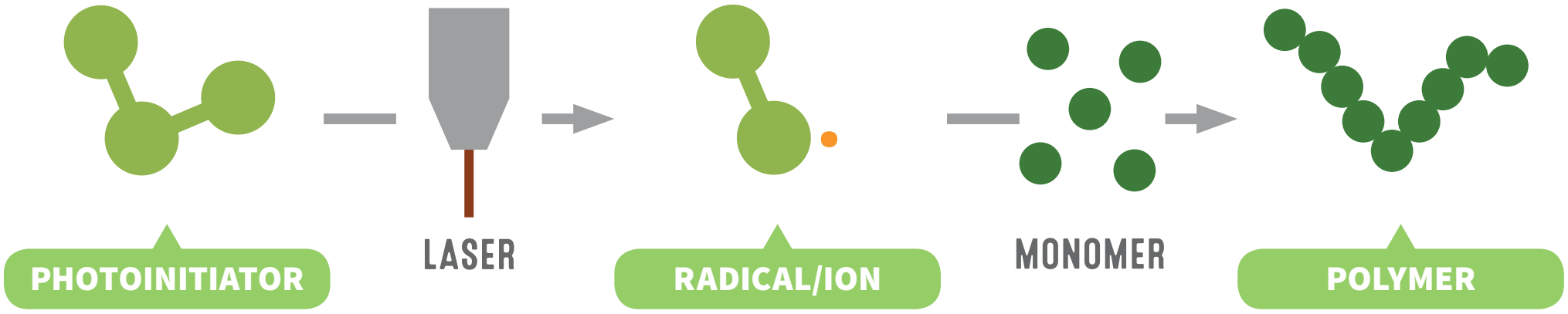




An alternative to current LOC design is using 3D printing. Stereolithography can be used; this uses a resin bath, which contains molecular building blocks (monomers) and photointiators which release cations or radicals when exposed to light.

A laser provides the light needed, and the cations or free radicals react with the monomers, forming a large, solid polymer network. This is called photopolymerisation.

HOW DOES THE PHOTOPOLYMERISATION PROCESS WORK?



WHY DOES THIS RESEARCH MATTER?

3D printed lab-on-a-chip devices are much quicker and cheaper to produce. They can be used for a range of purposes, including disease diagnosis in epidemic-hit areas, or as particle analyser chips.

$12 PER CHIP

ONLY TAKE A FEW HOURS TO PRINT

Based on research and materials provided by Sarah Hampson, PhD candidate at Loughborough University, UK.

CHEMUNICATE