

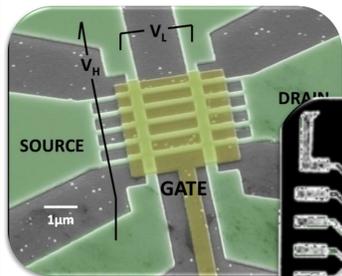
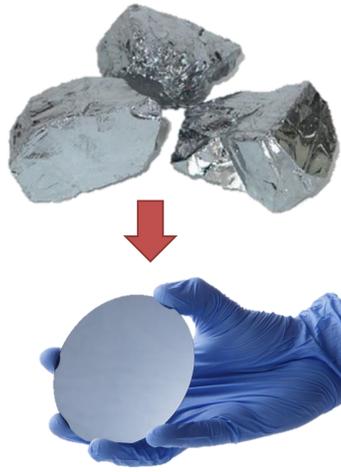
Festival della Scienza

Genova, 26 ottobre _ 5 novembre 2017

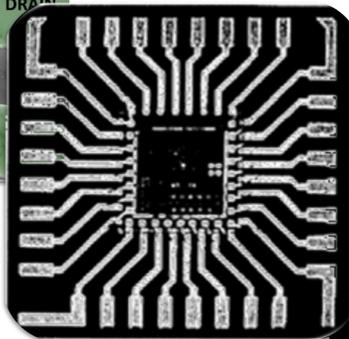
Contatti

WHAT'S SILICON?

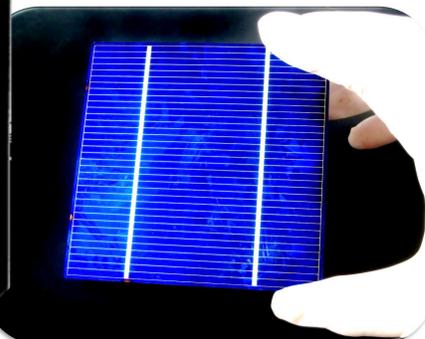
A hard and brittle crystalline solid with a blue-grey metallic lustre. It is a semiconductor and silicon chips are typically used in electronics to make computer components, transistors, solar cells, circuits...



Transistor/ Image Credit: www.phys.org



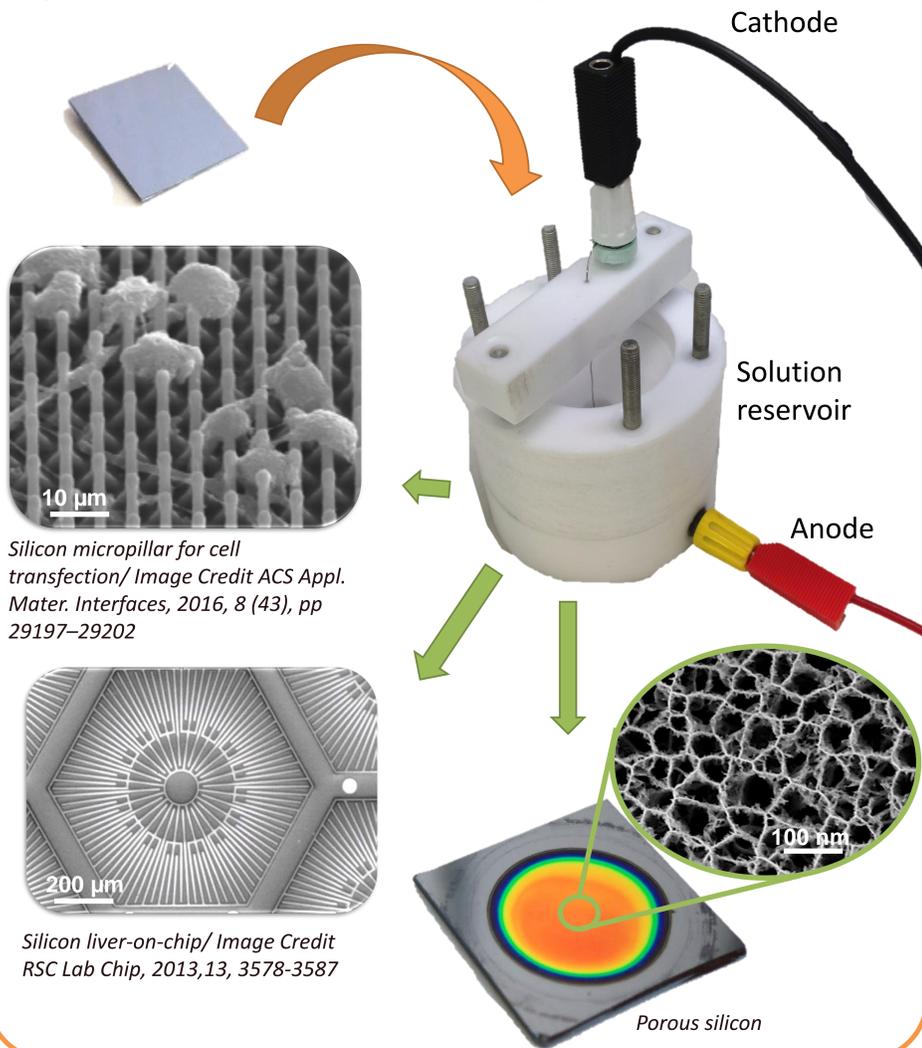
Integrated Circuit/ Image Credit Philips Research Laboratory



Silicon Solar Cell / Image Credit: www.phys.org

...HOW CAN WE MAKE SILICON "ALIVE"?

Silicon can be etched in a hydrofluoric acid by applying an electrical current to produce functional structure that can mimic the human organs or porous structure to detect bio-products.

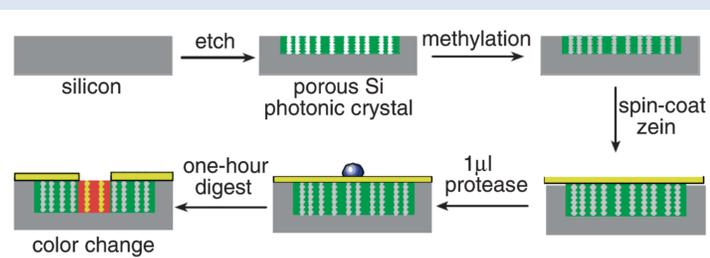


Silicon micropillar for cell transfection/ Image Credit ACS Appl. Mater. Interfaces, 2016, 8 (43), pp 29197–29202

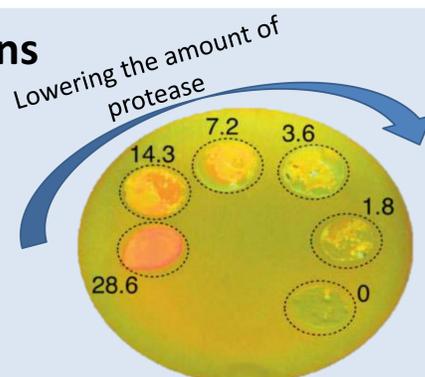
Silicon liver-on-chip/ Image Credit RSC Lab Chip, 2013,13, 3578-3587

FROM SILICON TO BIO-ORGANIC

Detection of proteins

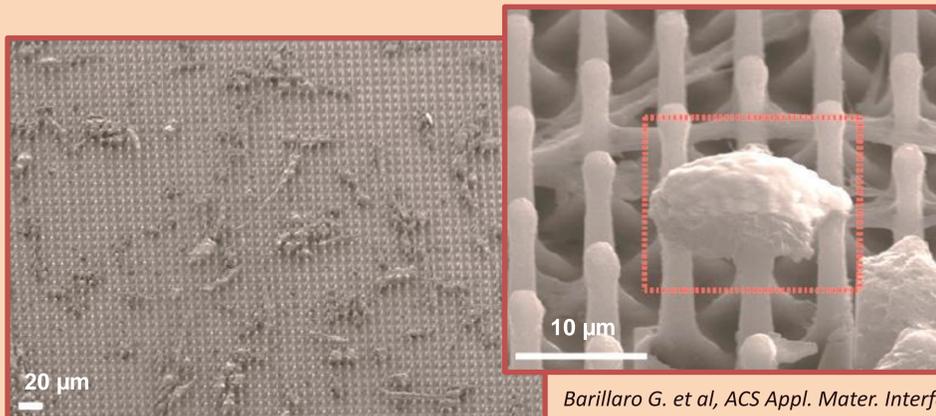


Infiltration of protein after the protease cleavage induces a change in the colour of the porous silicon structure



Sailor M. J. et al, Wiley Adv. Mat, 2006,18, 1393-1396

Cells transfection

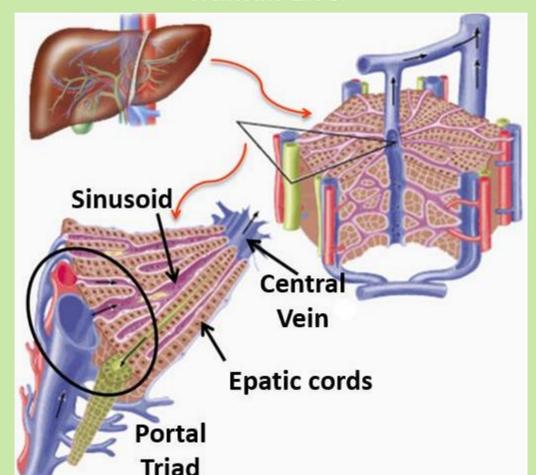


Silicon micropillar (1 µm) interact with the cells to transfer genetical materials (i.e. DNA, siRNA...) inside the cytoskeleton.

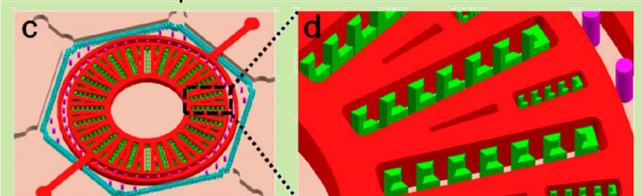
Barillaro G. et al, ACS Appl. Mater. Interfaces 2016, 8, 29197–29202

Organs-on-Chip

Human Liver



Liver-on-chip



Wang J. et al, ACS Anal. Chem. 2016, 88, 1719–1727

Many organs can be reproduced using functional silicon scaffolds where human cells can live and reproduce.