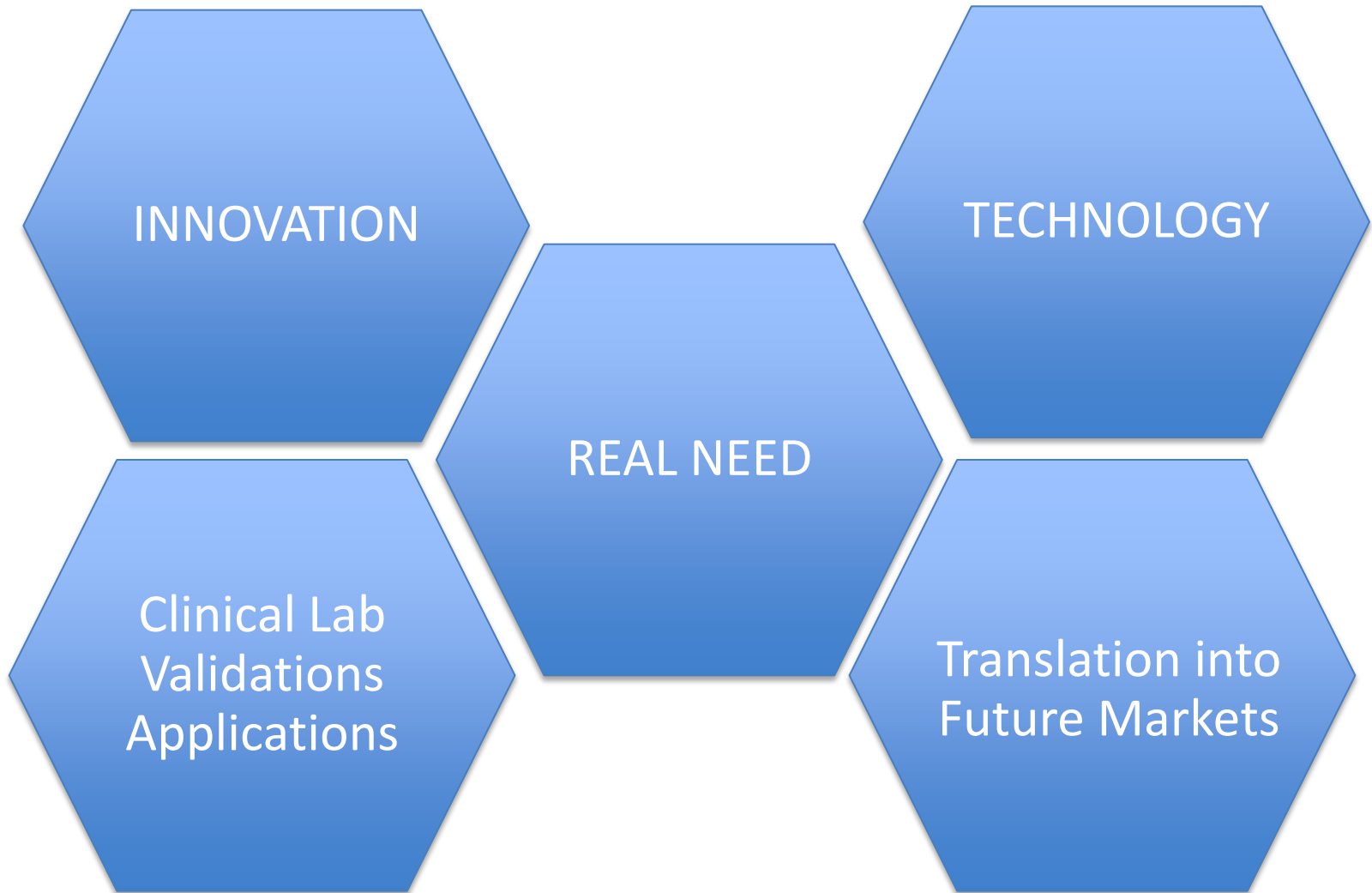


Need drives innovation through collaboration





Magnetic Levitation



CANARY CENTER
AT STANFORD



Marty McFly in "Back to the Future" when he travelled to 2015

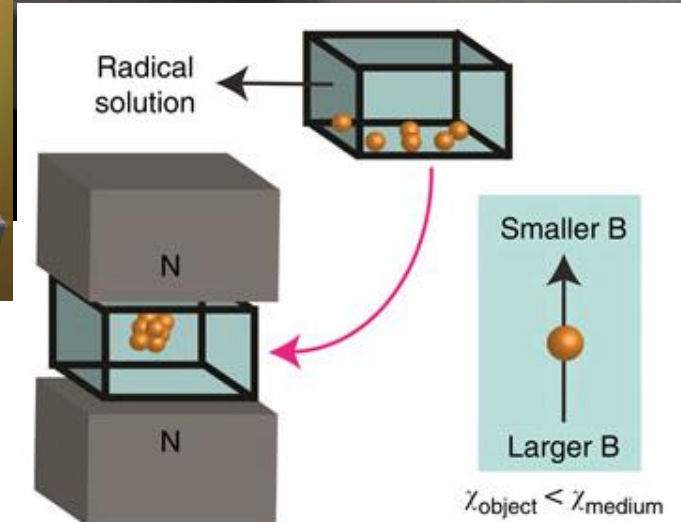
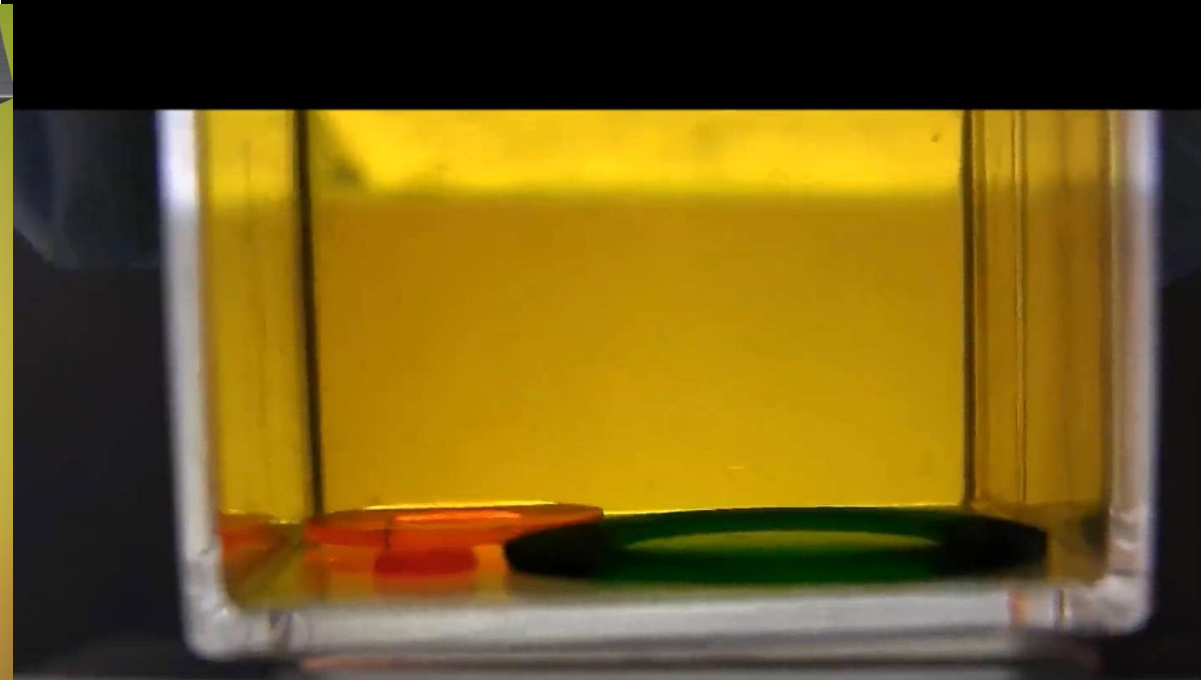
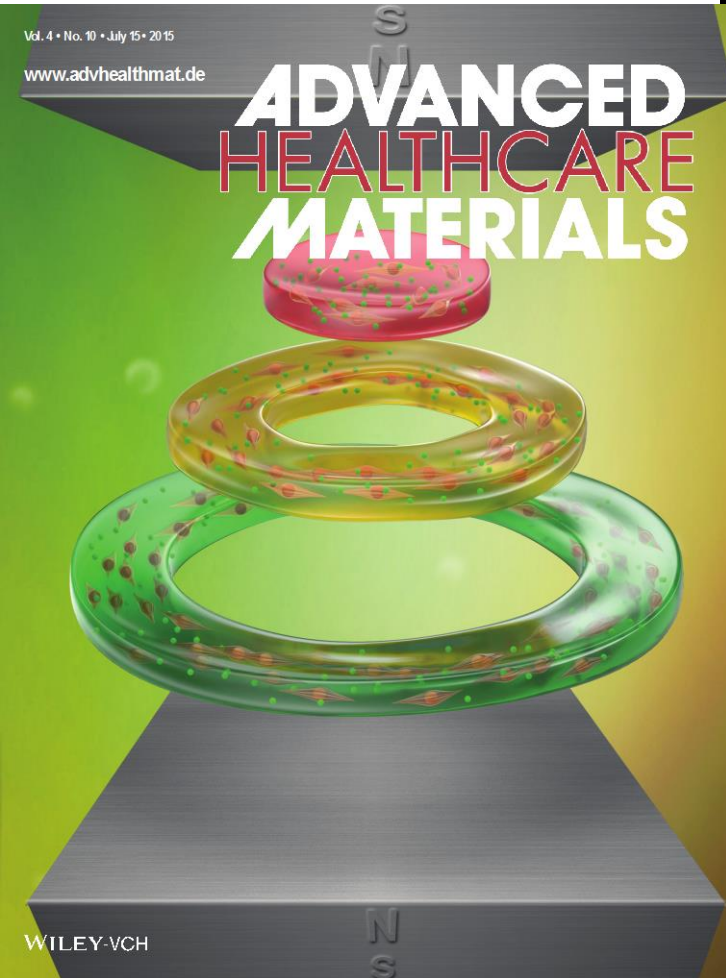
Magnetic Levitation

A frog levitated in very high magnetic field (>10 T)



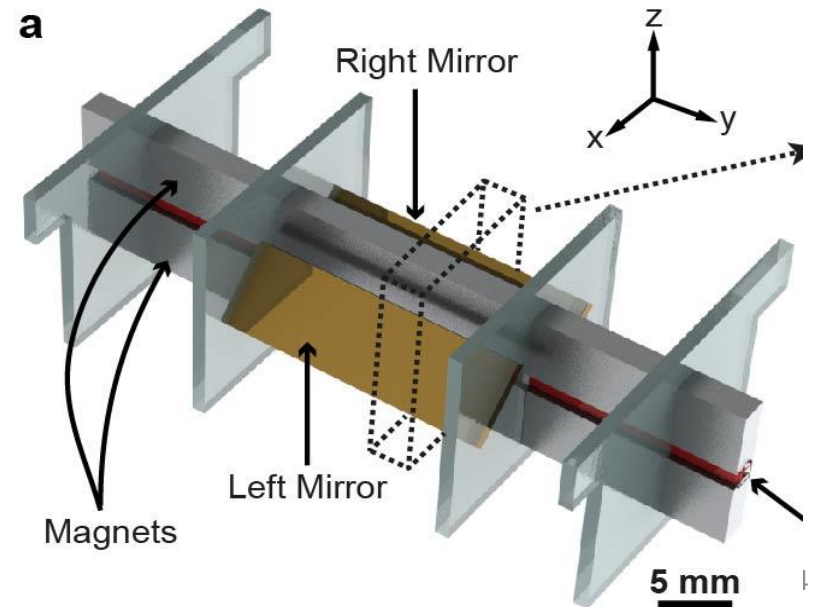
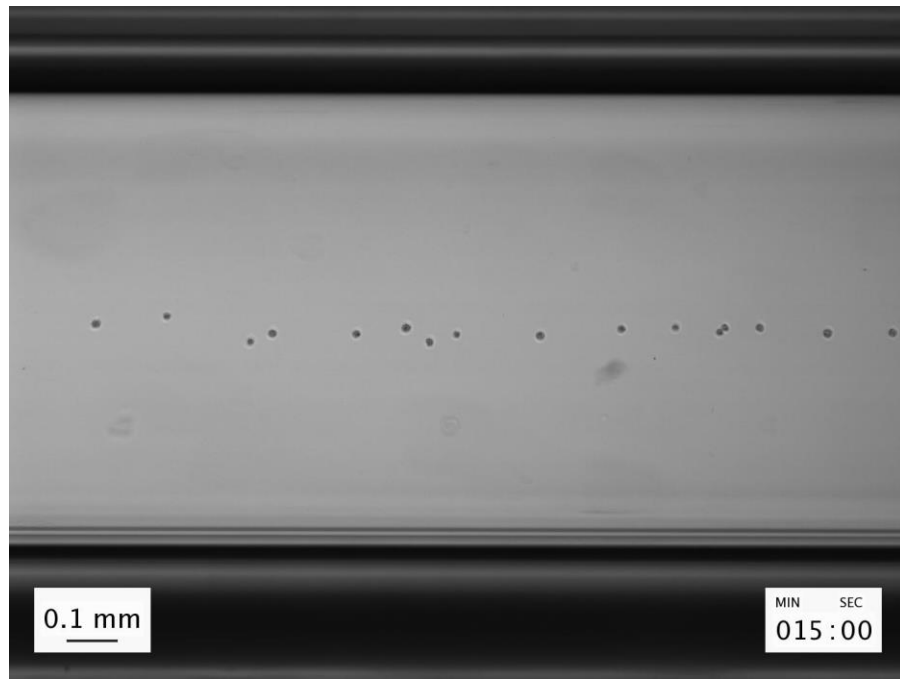
<http://www.youtube.com/watch?v=A1vyB-O5i6E>

MagLev for Tissue Engineering

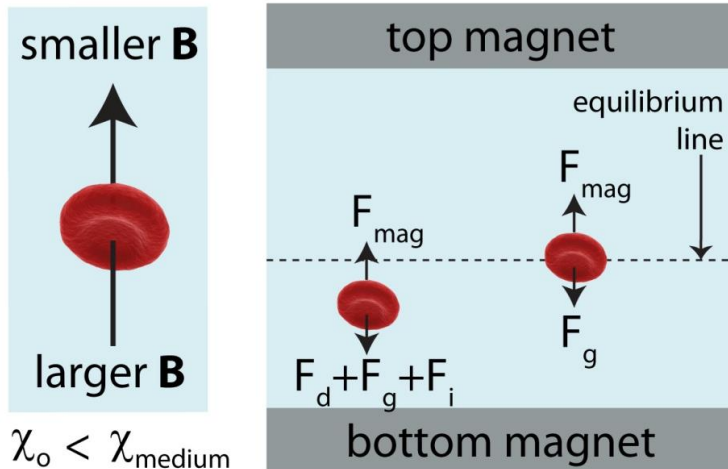
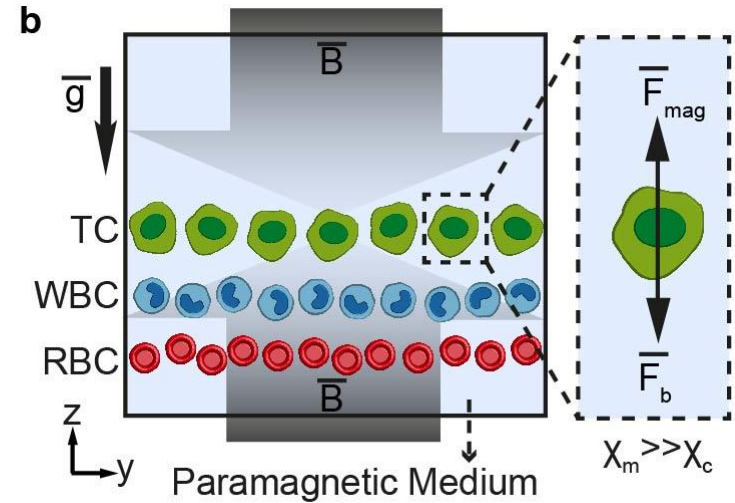
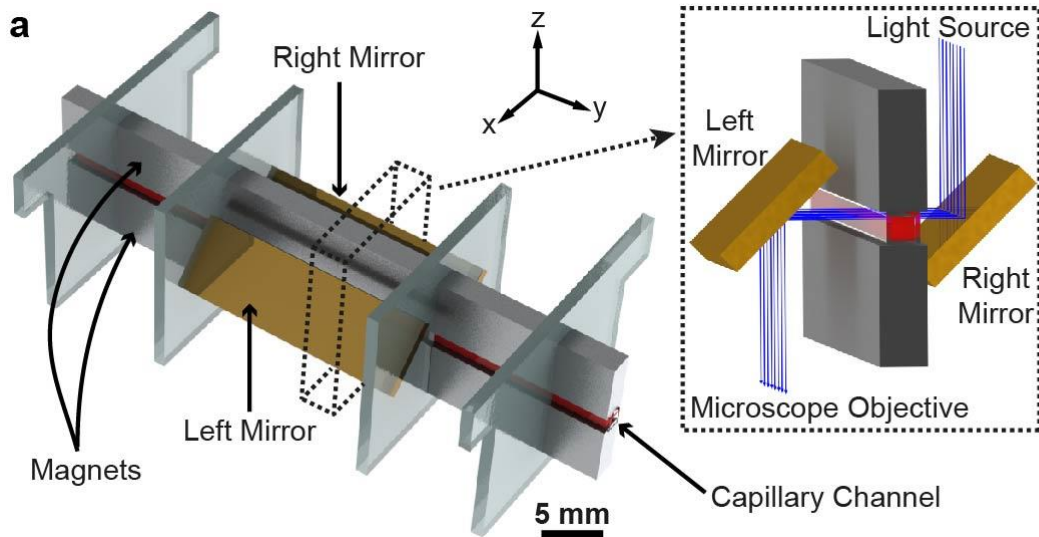


2x

Disruptive Technology



Disruptive Technology



Equilibrium position depends on:

- a) Cellular density
- b) Inherent magnetic signature

“Magnetic Blueprints”

Disruptive Technology

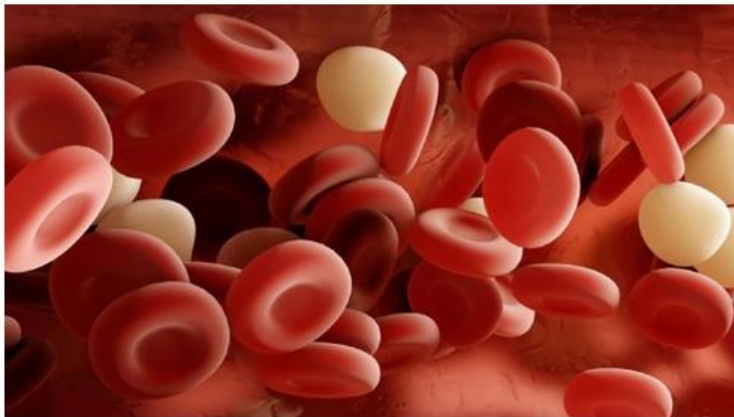
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DAILY NEWS 29 June 2015

Single cells made to levitate, just like frogs and mice



Levitating cancer cells (Image: Durmus et al., Stanford University)

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By: Physics Today

30 June 2015

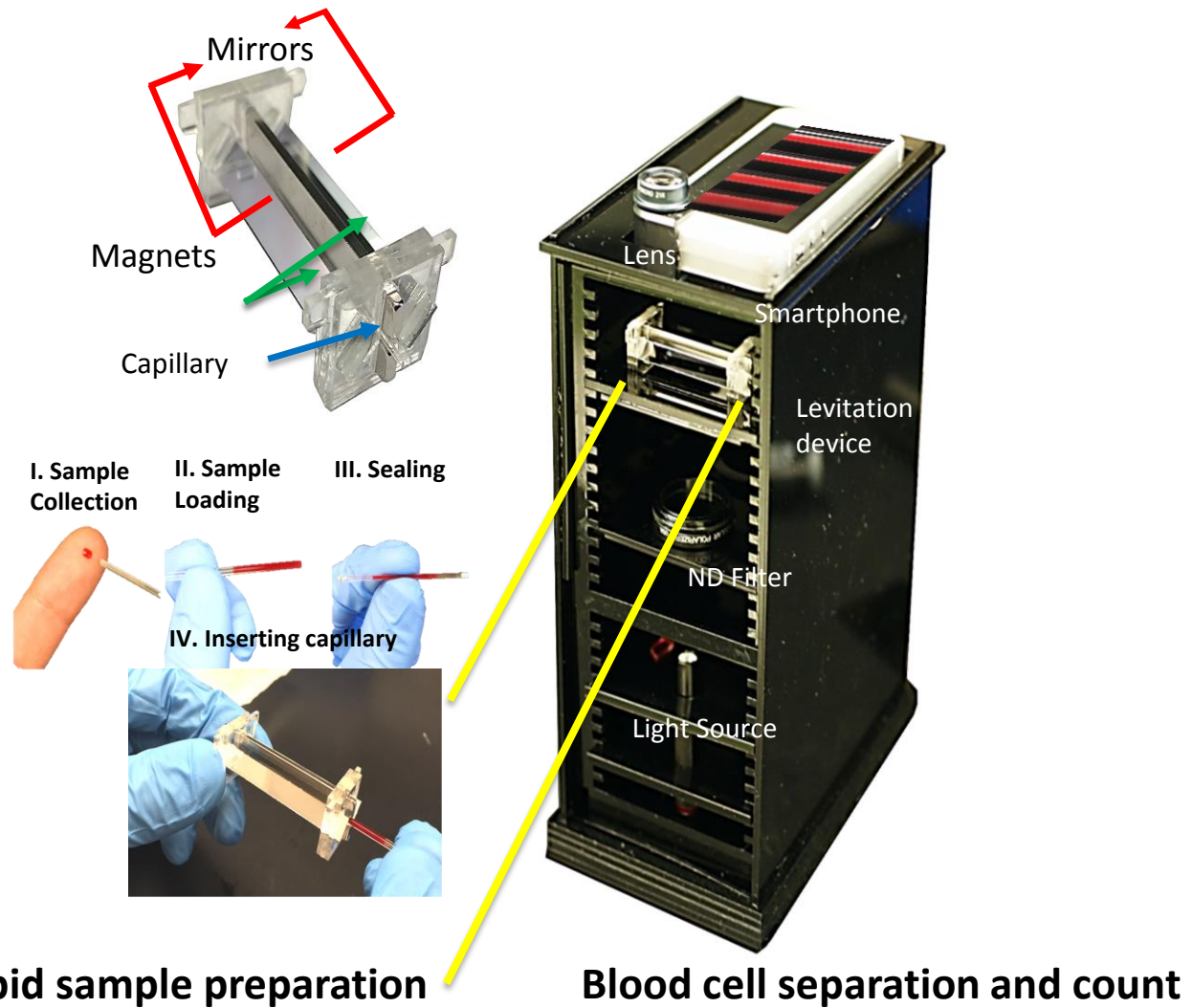
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Science: An innovative technique has been developed that uses magnets to levitate individual living cells. Utkan Demirci of Stanford University and colleagues added particles of gadolinium, a rare-earth metal, to a fluid in a channel positioned between two long, toothpick-sized magnets. The magnetic field pulls the Gd downward, which allows the cells to rise upward. How high the cells rise indicates their density with respect to the Gd. Because different types of cells levitate to different heights, the method could be used to distinguish cancer cells from blood cells, or red blood cells from white. The technique could also be used to monitor changes in cellular density and levitation due to antibiotic or cancer treatments.

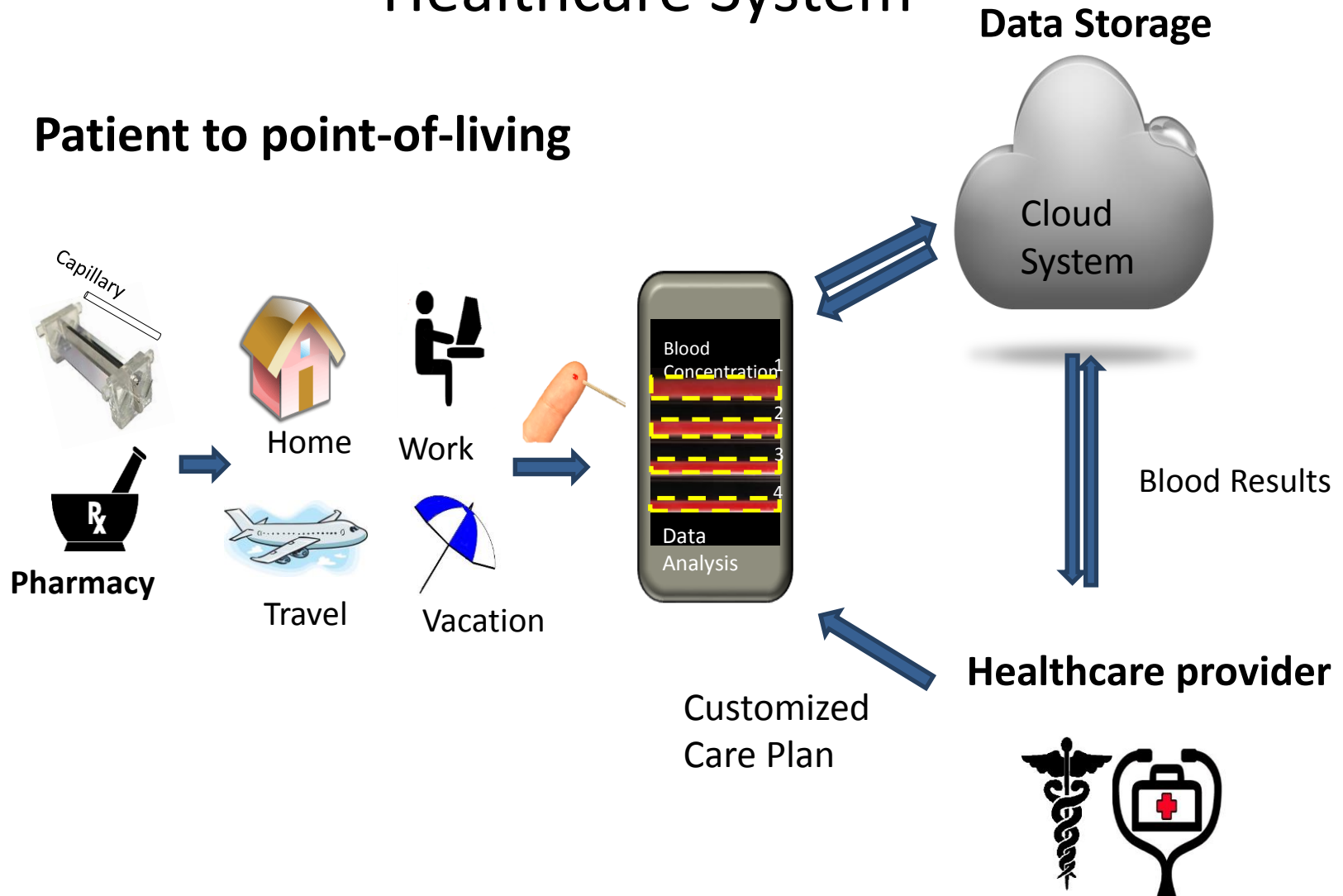
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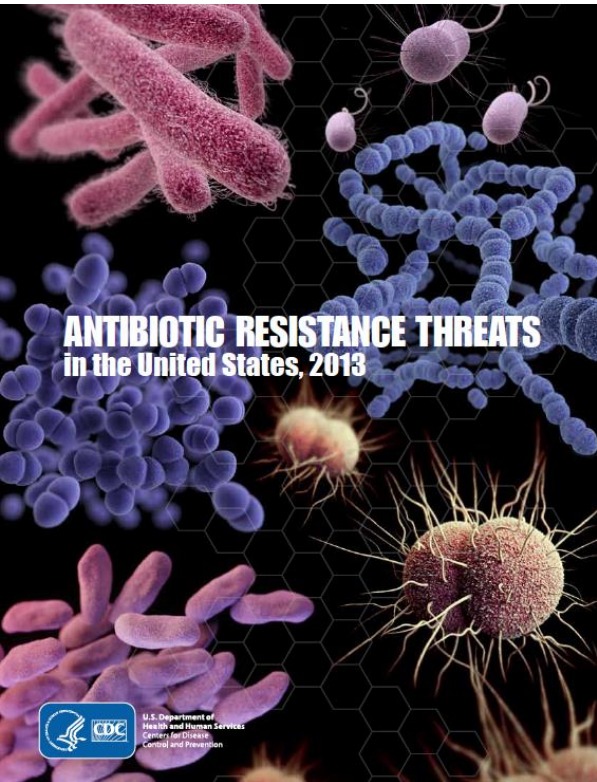
i-LEV: Integrating Magnetic Levitation with Mobile Platforms



Translation and Vision: Integration of i-Lev with Future Mobile Healthcare System



Summary



- Need drives innovation through collaboration.
- Cutting across disciplines helps innovation.
- Innovation is stepwise and takes time.
- One technology intended for one area might solve a complete other problem. Innovation!