Defined Shear Stress

$$\tau = \frac{F}{A}$$
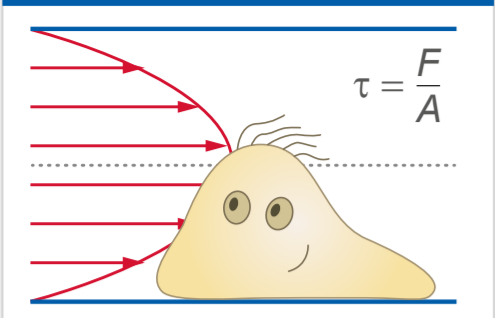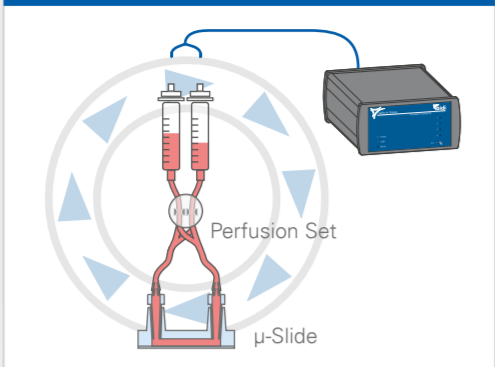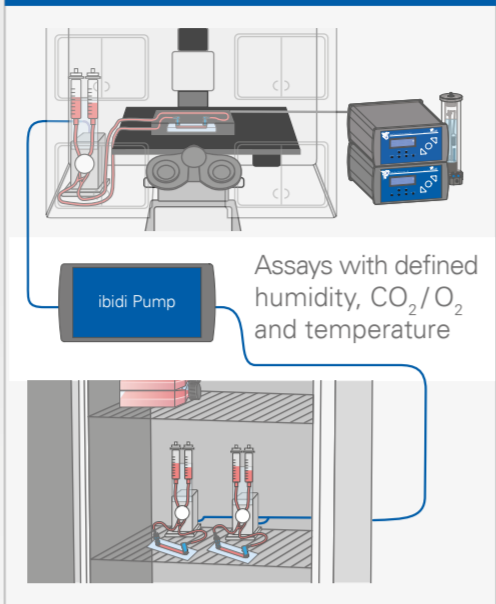
- Software-based flow programming including shear stress and shear rate calculation
- Simulation of all physiological flow patterns with a wide shear stress range (0.1–200 dyn/cm²)
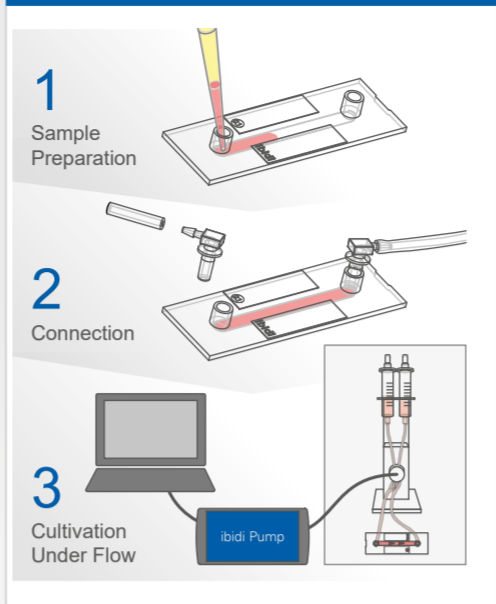
Closed System

Perfusion Set

μ-Slide

- Long-term sterile setup
- Recirculating medium at low volumes
- No medium contact with mechanical parts

Physiological Conditions

ibidi Pump
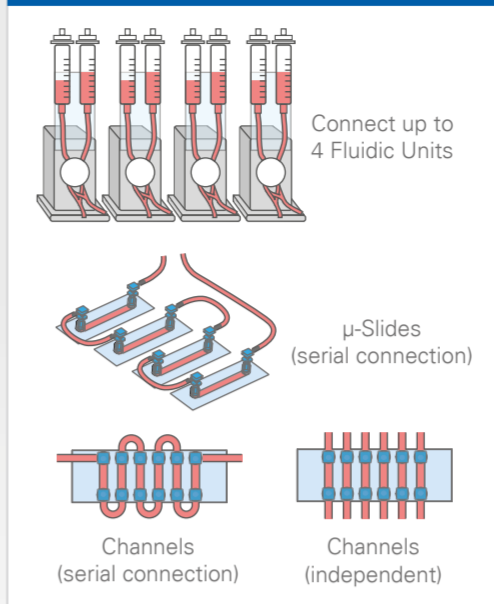
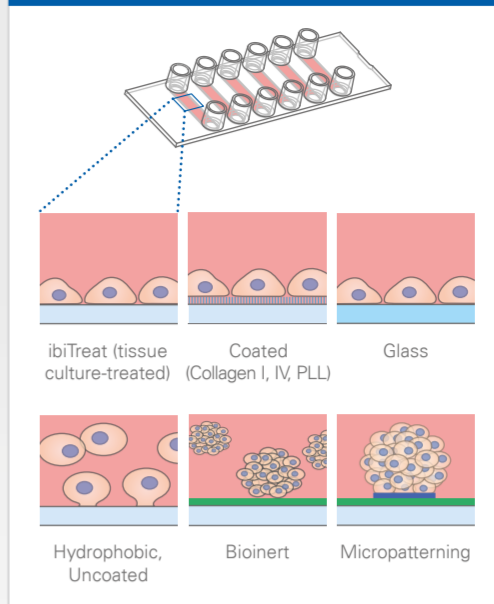Assays with defined humidity, CO_2 / O_2 and temperature

Easy Workflow

1 Sample Preparation

2 Connection

3 Cultivation Under Flow

ibidi Pump

Standard Luer Ports

- Plug-and-play connection
- No microfluidic knowledge necessary
- Easy adaptation to custom-specific setups

Parallelization

Connect up to 4 Fluidic Units

μ-Slides (serial connection)

Channels (serial connection)

Channels (independent)

Flow Chamber Surfaces

ibiTreat (tissue culture-treated)

Coated (Collagen I, IV, PLL)

Glass

Hydrophobic, Uncoated

Bioinert

Micropatterning

Microscopy Readout

#1.5 ibidi Polymer Coverslip or #1.5H glass coverslip
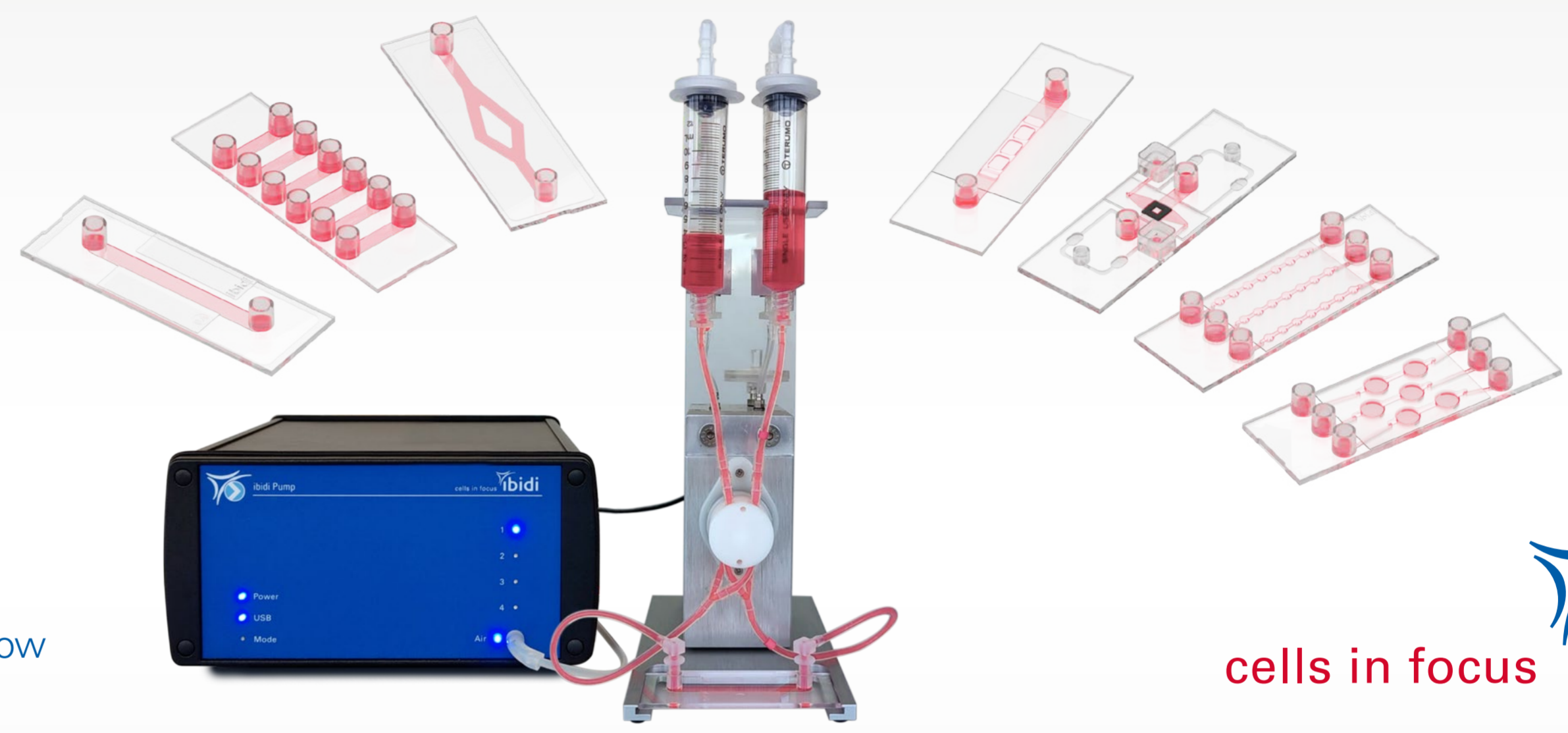
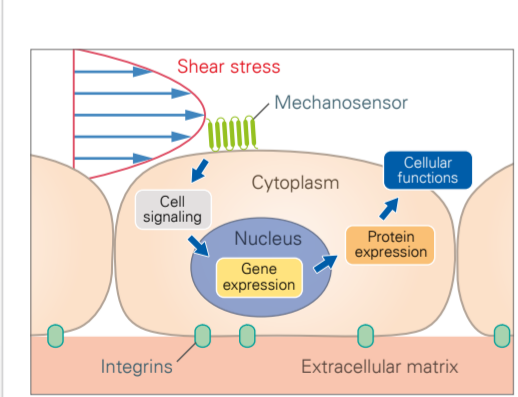Compatible with live cell imaging and microscopy of fixed cells

The ibidi Pump System

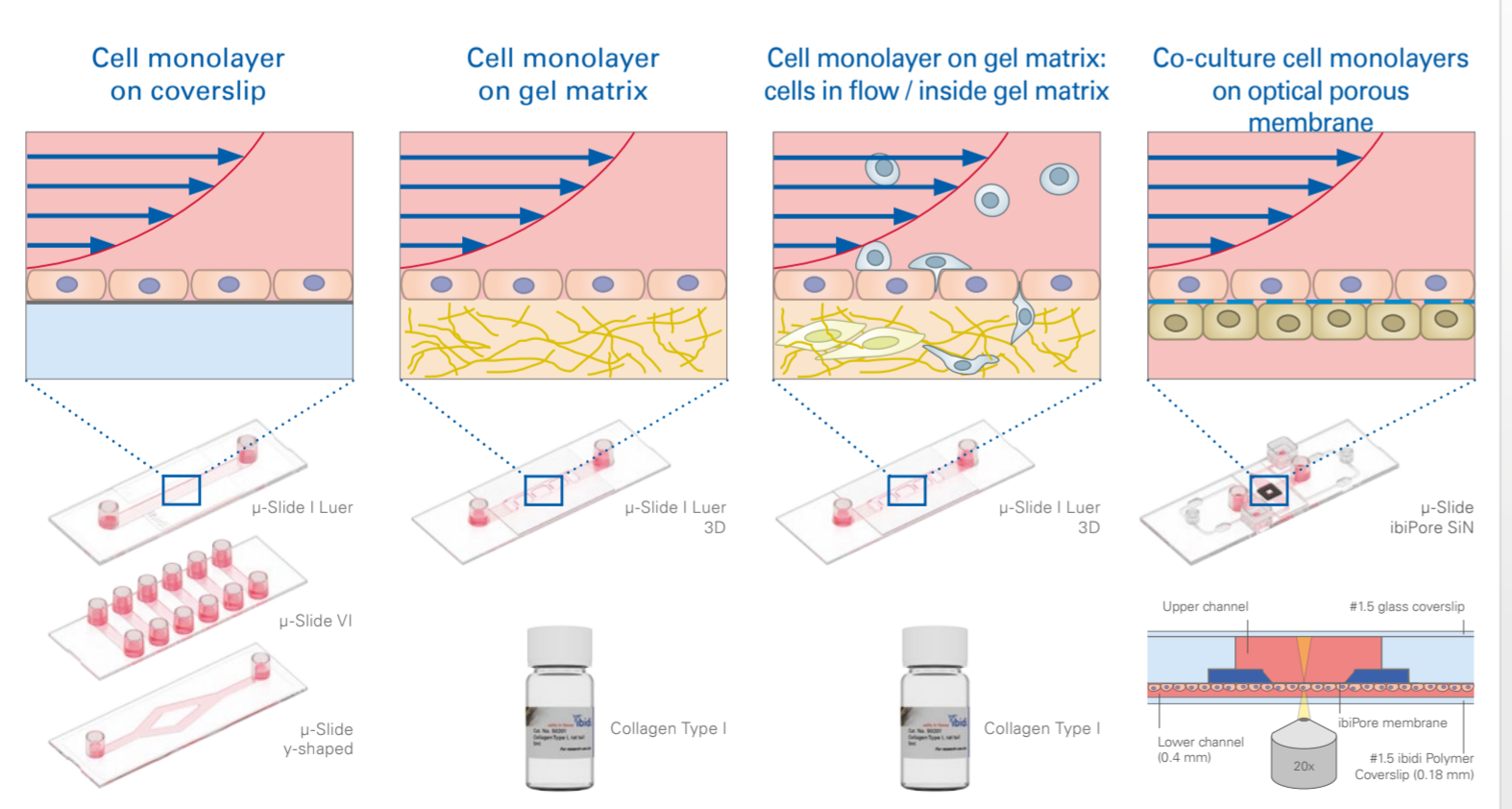## Revolutionize Your Cell Culture Assays

- Establish perfused *in vivo*-like cell cultures
- Simulate defined flow types (laminar unidirectional, pulsatile, and oscillatory)
- Compatible with μ-Slides with Luer adapters
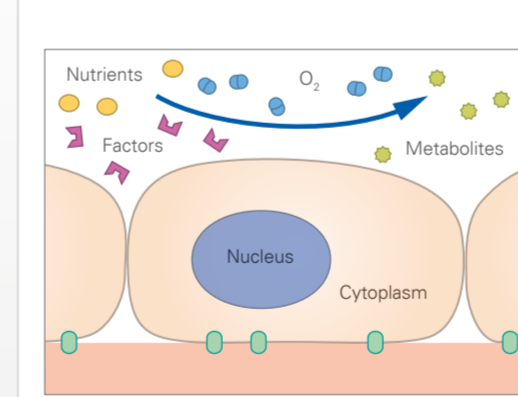- Combine with microscopes for live cell imaging under flow

ibidi Pump

Power
USB
Mode

cells in focus **ibidi**®

Wall Shear Stress

Shear stress
Mechanosensor
Cellular functions
Cell signaling
Cytoplasm
Nucleus
Gene expression
Protein expression
Integrins
Extracellular matrix

Cell monolayer on coverslip — μ-Slide I Luer — μ-Slide VI — μ-Slide y-shaped

Cell monolayer on gel matrix — μ-Slide I Luer 3D — Collagen Type I

Cell monolayer on gel matrix: cells in flow / inside gel matrix — μ-Slide I Luer 3D — Collagen Type I

Co-culture cell monolayers on optical porous membrane — μ-Slide ibiPore SiN

Upper channel — #1.5 glass coverslip — ibiPore membrane — Lower channel (0.4 mm) — #1.5 ibidi Polymer Coverslip (0.18 mm) — 20x

- Simulation of mechanical forces (shear stress) created by fluid flow in biofluidic systems (e.g., blood or lymphatic vessels, nephrons)
- Physiological long-term cultivation of vascular endothelial and epithelial cells
- Analysis of relevant readouts, such as cell morphology, behavior, and physiology

Perfusion-Based 3D Bioreactor

Nutrients — O_2 — Factors — Metabolites
Nucleus
Cytoplasm

3D spheroids / organoids in confined well geometry — μ-Slide VI 0.4 Spheroid Perfusion

Main well (perfusion-dominated) — Niche (diffusion-dominated)

3D spheroids / organoids on micropatterned surface — μ-Slide III 3D Perfusion

3D cell culture inside gel matrix — μ-Slide I Luer 3D — Collagen Type I

Co-culture of cells/ spheroids on and in gel matrix — μ-Slide III 3D Perfusion — μ-Slide I Luer 3D — Collagen Type I

- Physiological long-term 2D and 3D cell culture (e.g., of organoids, spheroids, organs-on-a-chip)
- Continuous medium exchange for constant nutrient supply
- Ensured optimal cell viability and health

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