
TISSUSE
Emulating Human Biology

# HUMIMIC Chip3
# Quick Guide



TissUse GmbH
Oudenarder Str. 16
13347 Berlin, Germany

Phone +49 (0)30 5130 264-00
E-Mail support@tissuse.com
Website www.tissuse.com

# Characteristics of the Chip

**PRODUCT CODE***

C3 - 03 - 07 - 03 - PS

**MATERIALS**

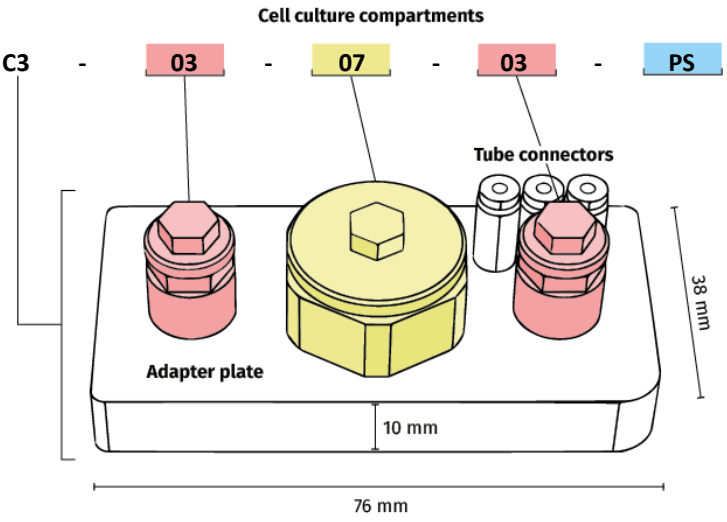
Adapter plate
**Polycarbonate (clear)**

Microfluidic layer
**Polydimethylsiloxane (PDMS, clear)**

Microscopic slide
**Glass (clear, ISO8037/1)**

Cell culture compartments
**PEEK (brown), Polycarbonate (clear)**

Sealings
**MVQ 70A (red)**

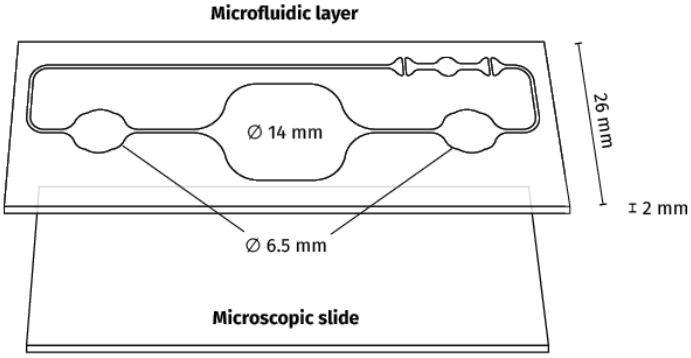



**MICROFLUIDIC DESIGN**

Microfluidic volume
**10 µl**

Microfluidic surface
**235 mm²**

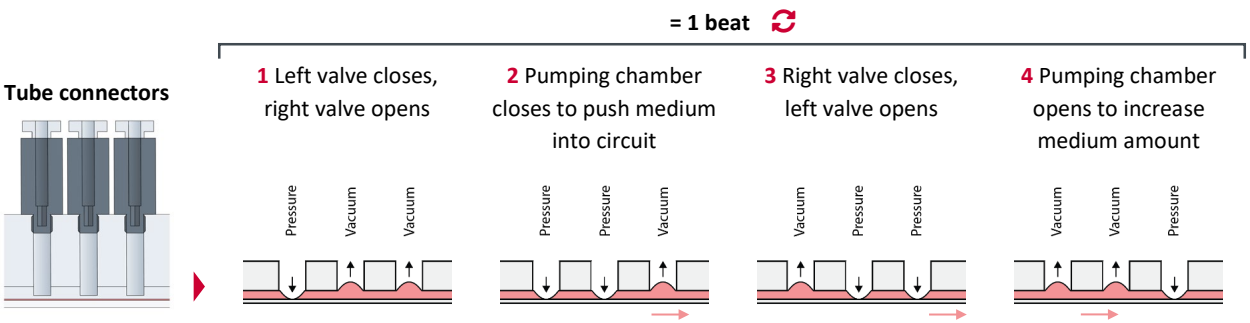
Channel height / width
**100 µm / 500 µm**




* This is an exemplary product code.
For information on product code, culture compartments & fluid types have a look at our **HUMIMIC** Product catalog.

# Pump principle

Each **HUMIMIC** Chip3 circuit contains three 500 µm thick pump membranes, which are operated by a change of pressured air and vacuum. This leads to opening and closing the valves.





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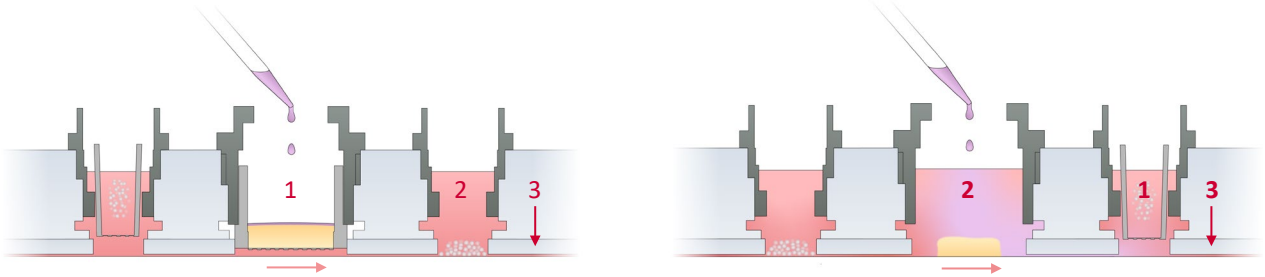
# Culture strategies and substance application routes

## Substance application routes

**Apical substance application**
e.g. on top of skin or intestine

**Systemic (intravenous) substance application,** directly into the medium




Cell culture compartment | Cell culture insert | 3D organ model | Spheroids | Applied substance

## Culture Strategies

**1 Cultivation in the cell culture compartments – in cell culture inserts*** protected by a porous membrane

**2 Cultivation in the cell culture compartments – directly in the flow** e.g. together with 3D scaffolds

**3 Cultivation in the microchannels** e.g. seeding with endothelial cells

* For information on the compatibility of cell culture inserts please have a look at our **HUMIMIC** Product catalog.

# Basic principles for handling your HUMIMIC Chips

Consider hazards and required personal protective equipment for your experiments.

**HUMIMIC** Chips themselves *do not* contain any toxic components or irritants.

Check for damage after delivery.

Store at 2 °C to 8 °C.

Chips are filled with PBS with/without antibiotics.

Guaranteed shelf life: 7 days after delivery.

Prolonged shelf life: exchange PBS for PBS with antibiotics.



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# Required materials for handling your HUMIMIC Chips

1.5 mm hexagon key with grip

7mm hexagonal socket wrench

**HUMIMIC** 10mm, 13mm & 24mm Wrench

**HUMIMIC** Chip spare lids

▸ included in your **HUMIMIC** Starter delivery

Pipettes and respective pipette tips

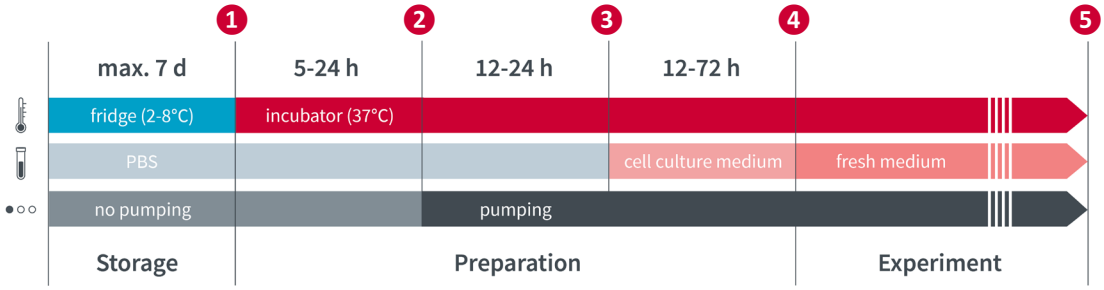
Sterile tweezers

Vessels for liquid waste and **HUMIMIC** tools

Deep well plate or 1.5 ml reaction tubes

Ethanol soaked tissues

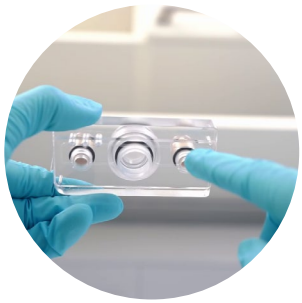
# HUMIMIC Chip3 cultivation timeline




## 1 Unpacking the HUMIMIC Chips

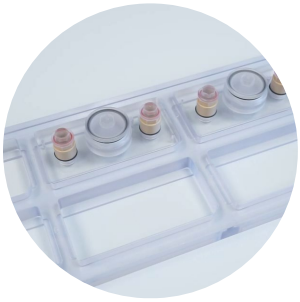
**1** Open package.

**2** Open plastic bag.
! Watch out for glass bottom.

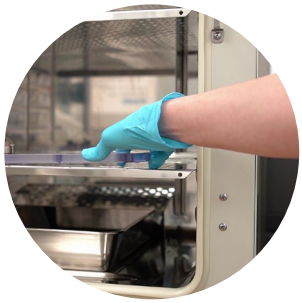


**3** Check for irregularites macro- and microscopically.

**4** Wipe with Ethanol soaked tissue.



**5** Place into **HUMIMIC** Holder.



**6** Put into incubator.
▸ 37 °C | 5-24 h





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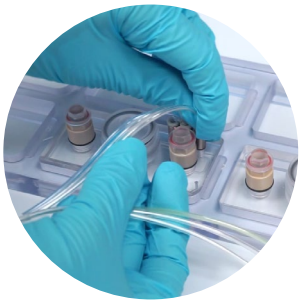
## 2 Start pumping

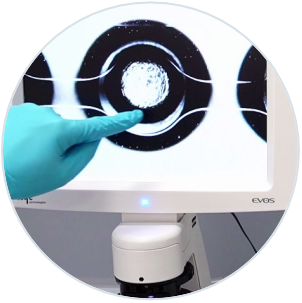
**7** Screw in **HUMIMIC** TubeAdapters.

**8** Set up pump settings according to the ▸ **HUMIMIC** Starter Quick Guide.

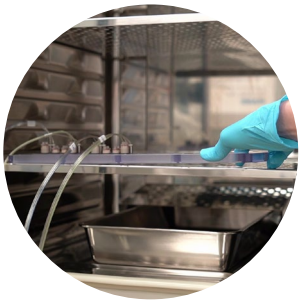


**9** Connect Chips to **HUMIMIC** Starter according to the ℹ info section below.

**10** Start pumping ▶.

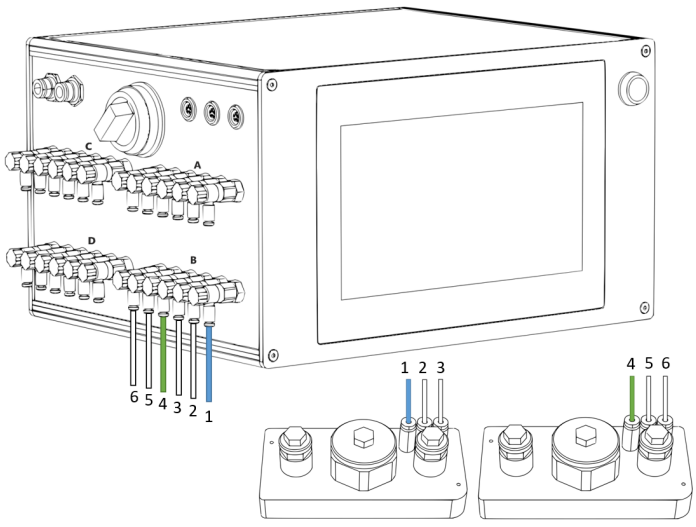


**11** Check pump activity.

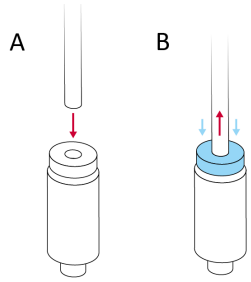


**12** Put into incubator.
▸ 37 °C | 12-24 h

## ℹ Connecting HUMIMIC Chip3 to HUMIMIC Starter




**A** To **connect** a tube, fully push tube into opening.
**B** To **remove** tube, disable the lock by holding down the release button (blue) while pulling out the tube at the same time.




❗ Tight connection of the tubes to the ports is important and indicated by a pressure point when pushing. The tightness of the connection can also be tested by shortly trying to pull out the tube as the pump connection ports feature a lock system!



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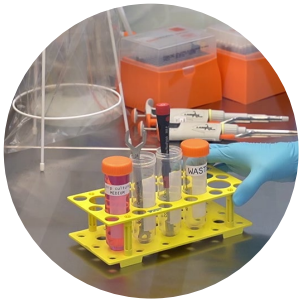
## 3 Medium exchange / 4 Loading the Chip with tissues

Exchange PBS to your respective Chip culture medium at least 12, ideally 72 hours* before starting the experiment.

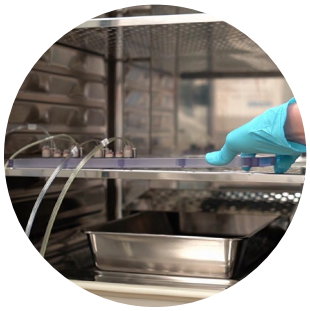
* to stabilize protein adsorption and evaporation

**13** Take culture medium out of the fridge.

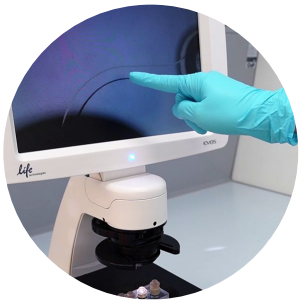
**14** Warm it up to 37 °C.



**15** Place medium under the bench together with required materials & tools ▸ p. 4.



**16** Take the **HUMIMIC** Chips out of the incubator.

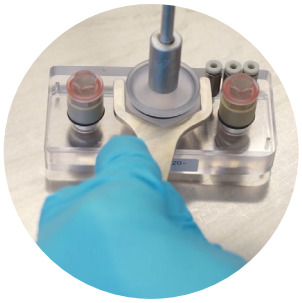


**17** Check microscopically for contaminations and leakages.

**18** Pause pumping ⏸.

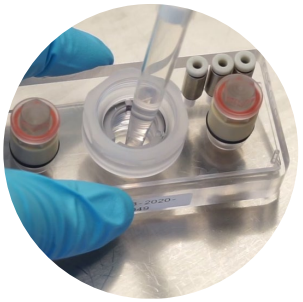
**19** Remove **HUMIMIC** Tubes. ▸ Use **HUMIMIC** TubeRemover for fast & easy removal.

**20** Wipe **HUMIMIC** Chip with ethanol soaked tissue and place under the bench.



**21** Use **HUMIMIC** 10mm, 13mm or 24mm Wrench to lock the reservoir. Use 7mm hexagonal socket wrench to open the lid.

**22** Carefully remove the lid and put it upside down into 50 ml centrifuge tube.



**23** Remove liquid from the culture compartment. Collect it in an appropriate collection tube or discard it.



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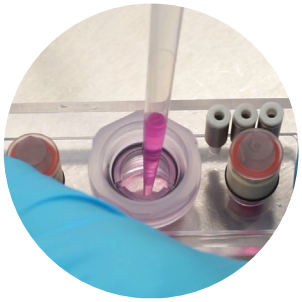
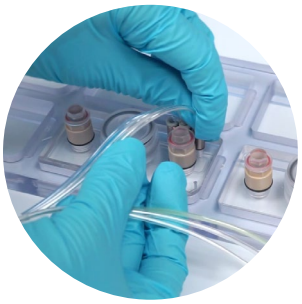


**24** Add pre-warmed Chip culture medium (**96well**: 150-500 µL **24well**: 300-2000 µL, depending on assay and culture compartment type).

**3 Medium exchange**
Continue with step **25**
**4 Loading the Chip**
Load compartment with tissues (info section below)

**25** Close the lid.
Repeat steps **21** to **25** with the other compartments.

**26** Wipe **HUMIMIC** Chip with ethanol soaked tissue.



**27** Connect Chips to **HUMIMIC** Starter according to the info section on p. 5.

**28** Start pumping, check pump activity and put the **HUMIMIC** Chips back into the incubator.

## Loading the Chip with tissues

### ADD CELL CULTURE INSERTS …

**… into 96-well size culture compartments**

1. Fill up the culture compartment with 300 µL of medium.
2. You have to separate the 96-well sized cell culture insert from the bulk plate using a hot blade if Transwell® or Millicell® systems are used.
3. Carefully take the cell culture insert with sterile tweezers and place it with the membrane bottom side on the medium surface.
4. Remove as much medium as possible from the culture compartment while pushing down the insert. Avoid adding any air bubbles below the insert membrane.

**… into 24-well size culture compartments**

1. Fill up the culture compartment with 500 µL (Millicell standing insert) or 300µL (hanging Transwell system) of medium.
2. Carefully take the 24-well sized cell culture insert (Millicell® standing insert or hanging Transwell® system) with sterile tweezers and place it with the membrane bottom side on the medium surface without adding any air bubbles below the membrane.
3. Only for Millicell standing inserts: remove 200 µL of medium.

### ADD SPHEROIDS

1. Collect respective amount of spheroids needed per circuit in a medium-filled well of a 24-well ULA plate.
2. Let the spheroids settle to the lower rim of the well.
3. Collect spheroids in a 200 µl wide bore tip.
4. Let the spheroids settle in the tip.
5. Dip the tip into the medium of the respective culture compartment and let the spheroids settle into the culture compartment.

### ADD HYDROGELS

1. Collect the hydrogel using a small sterile spoon from the respective well of a 96-well plate.
2. Dip the spoon with the hydrogel into the medium and let the hydrogel settle to the **HUMIMIC** Chip culture compartment bottom.

### ADD NOTHING …

… and use culture compartment as medium reservoir only.



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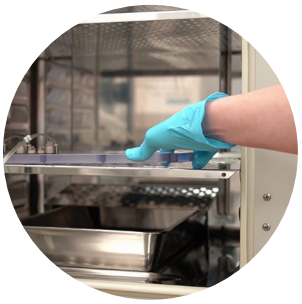
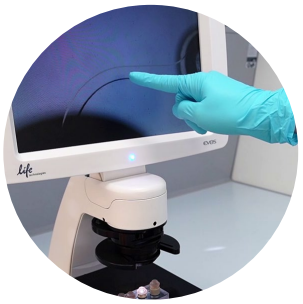
## 5 Ending a HUMIMIC Chip3 cultivation

**29** Prepare well plate or 1.5 ml reaction tube with pre-warmed culture medium or PBS depending on the desired endpoint analysis.



**30** Take the **HUMIMIC** Chips out of the incubator.

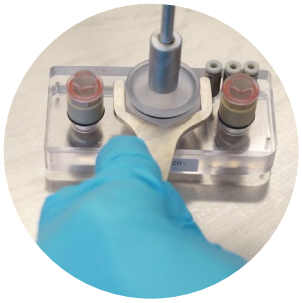


**31** Check microscopically for contaminations and leakages.

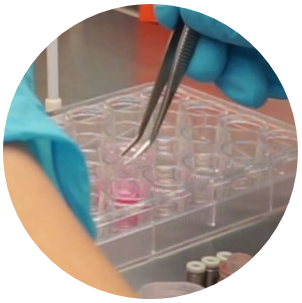
**32** Pause pumping ⏸.

**33** Remove **HUMIMIC** Tubes
▸ Use **HUMIMIC** TubeRemover for fast & easy removal.

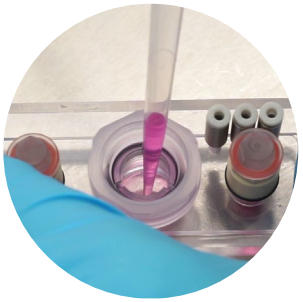
**34** Wipe **HUMIMIC** Chip with ethanol soaked tissue and place it under the bench.



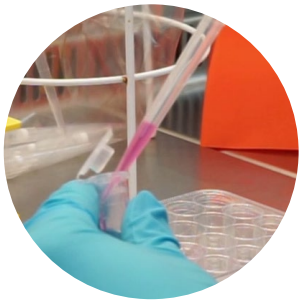
**35** Use **HUMIMIC** 10mm, 13mm or 24mm Wrench to lock the reservoir. Open and remove the lid with 7mm hexagonal socket wrench.



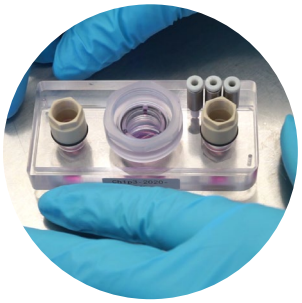
**36** Transfer organ models from the Chip to the prepared collection tube or plate.



**37** Remove liquid from the culture compartment.



**38** Collect it in an appropriate collection tube or well.



🔄 Repeat steps **35** to **38** with the other compartments.

**39** Unscrew **HUMIMIC** TubeAdapters. Clean them with ethanol and store in a safe place for later use.





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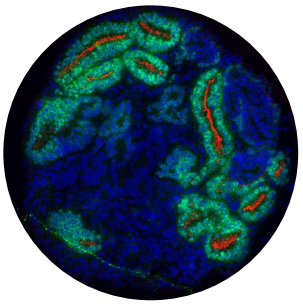
**40** The **HUMIMIC** Chip is a single use product and should be sterilized before disposal.

**41** Recycle hazardous samples according to the national guidelines.



**42** Perform endpoint analysis with the medium samples and organ models. Usually there is enough material per Chip to be used for different analysis.



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## Warranty/Disclaimer





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