The ibidi product family is comprised of a variety of µ–Slides and µ–Dishes, which have all been designed for high–end microscopic analysis of fixed or living cells. The high optical quality of the material is similar to that of glass, so you can perform all kinds of fluorescence experiments with uncompromised resolution and choice of wavelength.
The µ–Slide Angiogenesis is a cell culture product for angiogenesis assays and direct cell culture. Cells can be grown on gel matrices, e.g. collagen gels, hyaluronic gels or BD Matrigel™ (Becton–Dickinson) or directly on the ibidi polymer coverslip.

Material

ibidi µ–Slides, µ–Dishes, and µ–Plates are made of a plastic that has the highest optical quality. The polymer coverslip on the bottom exhibits extremely low birefringence and autofluorescence, similar to that of glass. Also, it is not possible to detach the bottom from the upper part. The µ–Slides, µ–Dishes, and µ–Plates are not autoclavable, since they are only temperature–stable up to 80°C/175°F. Please note that gas exchange between the medium and incubator's atmosphere occurs partially through the polymer coverslip, which should not be covered.

Optical Properties ibidi Polymer Coverslip	
Refractive index n_D (589 nm)	1.52
Abbe number	56
Thickness	No. 1.5 (180 µm)
Material	polymer coverslip

Please note! The ibidi polymer coverslip is compatible with certain types of immersion oil only. A list of suitable oils can be found on page 3.

Shipping and Storage

The µ–Slides, µ–Dishes and µ–Plates are sterilized and welded in a gas-permeable packaging. The shelf life under proper storage conditions (in a dry place, no direct sunlight) is listed in the following table.

Conditions	
Shipping conditions	Ambient
Storage conditions	RT (15-25°C)

Shelf Life of Different Surfaces	
ibiTreat, Glass Bottom, ESS	36 months
Collagen, Poly-L-Lysine	18 months

Geometry

The µ–Slide Angiogenesis provides standard slide format according to ISO 8037/1. The well to well distance of 9 mm (like 96 well plates) allows using multichannel pipettes.

Geometry of the µ–Slide Angiogenesis	
Number of wells	15
Volume inner well	10 µl
Diameter inner well	4 mm
Depth inner well	0.8 mm
Volume upper well	50 µl
Diameter upper well	5 mm
Growth area inner well	0.125 cm^2
Coating area using 10 µl	0.23 cm^2
Bottom matches coverslip	No. 1.5

µ–Slide Surfaces

Depending on the type of cells and the special application you are using, you will need µ–Slides with different surfaces. If you do not require any special adhesion molecules for your application, the best choice will be ibiTreat, a tissue culture treated surface.

The uncoated µ–Slide is manufactured from hydrophobic plastic. For the cultivation of most cell lines, it is indispensable to treat the uncoated µ–Slide with biopolymers, which mediate cell adhesion and growth.

Coating your µ–Slide Angiogenesis

In tube formation assays the µ–Slide Angiogenesis is coated with a 0.8 mm thick layer of gel matrix.

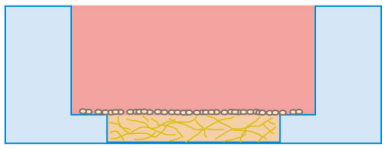
1. Prepare your gel matrix according to the manufacturer's protocol or reference.
2. Fill the inner well with 10 µl liquid gel. Avoid air bubbles.
3. Let the gel polymerize under appropriate conditions.

4. Use as soon as possible.
5. If storage is needed fill sterile water around the wells to generate a humidified environment to hinder evaporation.

Non-gel based coatings are also possible. Please use 10 µl coating solution and calculate with an area to be coated of 0.23 cm^2 per well. Further information about coatings is provided in Application Note 08 "Cell culture coating".

Tube Formation Assays

In a tube formation assay cells are seeded on top of the polymerized gel matrix:



1. Trypsinize and count cells as usual. Dilute the cell suspension to the desired concentration. Depending on your cell type, we recommend 1–3 $\times 10^5$ cells/ml.
2. Apply 50 µl of the cell suspension into the upper well. Do not touch the gel matrix with the pipet tip.
3. Cover the µ–Slide Angiogenesis with the supplied lid. Incubate at 37°C and 5 % CO_2 as usual.
4. Conduct your experiment.
5. Depending on the cell type, medium exchange is necessary every 1–2 days. Carefully aspirate the old medium and replace it by 50 µl fresh medium.

For a detailed protocol please refer to Application Note 19 "Tube Formation" and Application Note 5 "Tube Formation in µ–Plate Angiogenesis 96 well".

Further information about the optimization of experimental parameters and data analysis is provided in Application Note 27 "Tube Formation - Data Analysis".

Tip:

Air bubbles in the gel can be reduced by equilibrating the µ–Slide Angiogenesis before usage inside the incubator overnight.
In case bent gel surfaces are created, increase or decrease the amount of gel used, until you get flat and even gels.

Tip:

For less evaporation the space in–between the wells can be filled with sterile water or agarose. Add agarose to water or buffer solution (e.g. 0.1 g to 10 ml water). Melt agarose solution using a microwave or boiling water bath and allow the solution to cool to ~50°C.

Seeding Cells in 2D

You can also use the µ–Slide Angiogenesis for a standard 2D cell culture without gel matrix.

1. Trypsinize and count cells as usual. Dilute the cell suspension to the desired concentration. Depending on your cell type, application of a 1.8-4.3 $\times$ 10^5 cells/ml suspension should result in a confluent layer within 2–3 days.
2. Apply 10 µl cell suspension into each well of the µ–Slide. Avoid shaking as this will result in inhomogeneous distribution of the cells.
3. Cover the slide with the supplied lid. Incubate at 37°C and 5 % CO_2 as usual.
4. After cell attachment, add 50 µl cell–free medium to fill the upper well.

Attention!

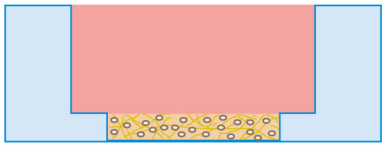
Avoid evaporation during seeding and cell culture in the incubator! We recommend placing the µ–Slide Angiogenesis in an extra humidity chamber (e.g. a Petri Dish with wetted paper).

Undemanding cells can be left in their seeding medium for up to three days and grow to confluence there. However, best results might be achieved when the medium is changed every 1–2 days. Carefully aspirate the old medium and replace it by 60 µl fresh medium per well.

Experimental Setups

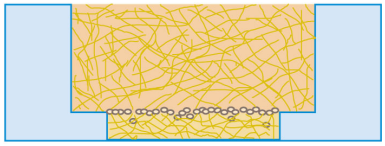
Alternatively, the µ–Slide Angiogenesis can be used for the following assays:

- Fill the inner well with cells suspended inside a gel matrix. After gel polymerization, add 50 µl cell–free medium to fill the upper well.



- Fill the inner well with a gel matrix and culture pieces of tissue or cell spheroids on it.

- Sandwich Cell Culture: Fill the inner well with a gel matrix. Seed cells on top of the polymerized gel and imbed the cells with 50 µl gel in the upper well.



- Fill the inner well with a low volume of the gel matrix, e.g. 8 µl. Seed cells on top of the polymerized gel. If necessary gently shake the slide to make the cells slide into the middle of the well.

- Fill the inner well with fibroblasts suspended inside a gel matrix. Seed cells on top of the polymerized gel. Overlay the cell layer with medium and incubate for invasion of the cells into the gel matrix.

Preparation for Cell Microscopy

When gel matrices are used the optical quality and the use of high magnification objective lenses might be restricted. Without any gel cells can be observed live or fixed directly in the wells on an inverted microscope. You can use any fixative of your choice. The plastic material is compatible with a variety of chemicals, e.g. Acetone or Methanol. Further specifications can be found at www.ibidi.com. Due to the thin bottom of only 180 µm, high resolution microscopy is possible.

Immersion Oil

When using oil immersion objectives, use only the immersion oils specified in the table. The use of a non–recommended oil could lead to the damage of the plastic material and the objective.

Company	Product	Ordering Number
Zeiss	Immersol 518 F	(Zeiss) 444960
Zeiss	Immersol W 2010	(Zeiss) 444969
Leica	Immersion liquid	(Leica) 11513859

References

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J. Searle, M. Mockel, S. Gwosc, S. A. Datwyler, F. Qadri, G. I. Albert, F. Holert, A. Isbruch, L. Klug, and D. N. Muller. Heparin Strongly Induces Soluble fms-Like Tyrosine Kinase 1 Release In Vivo and In Vitro. *Arteriosclerosis, Thrombosis, and Vascular Biology*, 2011. doi: 10.1161ATVBAHA111.237784.

E. Vo, D. Hanjaya-Putra, Y. Zha, S. Kusuma, and S. Gerecht. Smooth-Muscle-Like Cells Derived from Human Embryonic Stem Cells Support and Augment Cord-Like Structures In Vitro. *Stem Cell Reviews and Reports*, 2010. doi: 10.1007/s12015-010-9144-3.

Ordering Information

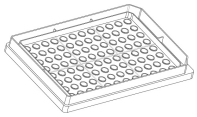
The µ–Slide Angiogenesis family is available with different surfaces and formats. See table below for choosing your µ–Slide and µ–Plate Angiogenesis, respectively.

µ–Slide Angiogenesis

Cat. No.	Description
81506	**µ–Slide Angiogenesis ibiTreat:** #1.5 polymer coverslip, tissue culture treated, sterilized
81501	**µ–Slide Angiogenesis Uncoated:** #1.5 polymer coverslip, hydrophobic, sterilized
81531	**µ–Slide Angiogenesis Microdissection:** PEN-membrane*, sterilized

* The PEN foil does not fit to standard cover slip thickness.

µ–Plate Angiogenesis 96 well



Cat. No.	Description
89646	**µ–Plate Angiogenesis 96 well ibiTreat:** #1.5 polymer coverslip, tissue culture treated, sterilized

For research use only!

Further technical specifications can be found at www.ibidi.com. For questions and suggestions please contact us by e-mail *info@ibidi.de* or by telephone +49 (0)89/520 4617 0. All products are developed and produced in Germany.