ThinCert™

6, 12 and 24 Well Cell Culture Inserts for Multiwell Plates

For advanced cell and tissue culture applications, Greiner Bio-One offers an extensive family of membrane supports - ThinCert™. Combining 6 different membrane specifications (pore size and density) in geometries to fit 6, 12 and 24 well plates, the ThinCert™ cell culture inserts are suitable for a wide range of applications including transportation, secretion and diffusion studies, migrational experiments, cytotoxicity testing, co-cultures, Trans Epithelial Electric Resistance (TEER) measurements, as well as primary cell culture.
ThinCert™ cell culture inserts are compatible with standard CELLSTAR® multiwell plates from Greiner Bio-One, and are pre-packed together with the requisite number of plates.
The automated production process includes double optical control of each insert produced, ensuring that any biological contamination is avoided. The sterility of the single blister-packed inserts and multiwell plates is ensured by irradiation.

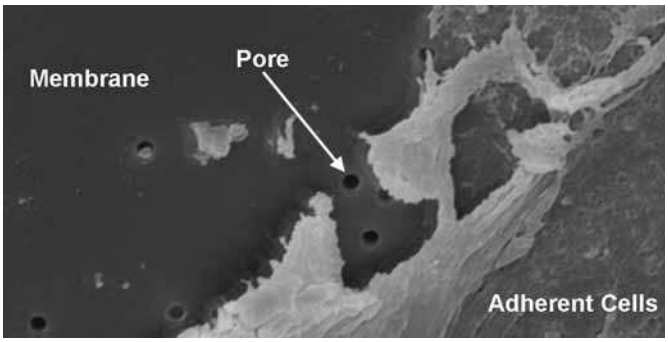

Figure 1: Electron micrograph of human osteosarcoma cells on ThinCert™ membrane. Courtesy of the Department of Oral and Maxillar Facial Surgery, University Hospital Freiburg.

ThinCert™ cell culture inserts are produced from high-grade clear polystyrene housings, and polyethylene terephthalate (PET) capillary pore membranes. Both materials, polystyrene and PET, are USP class VI certified and cell culture compatible. The coupling between the housing and the membrane is achieved using an automated process which produces an extremely strong and robust seal without compromising or weakening the membrane in any way. The membranes undergo a physical surface treatment to optimise cellular adherence and growth characteristics (Fig. 2). All the capillary pores in a membrane exhibit a high degree of uniformity in diameter. This uniformity ensures reliable and consistent exchange rates between the two compartments and so guarantees reproducibility when conducting multiple experiments.

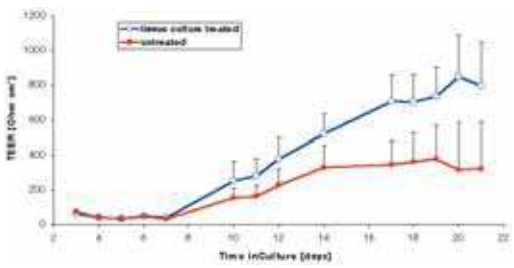

Figure 2: Different growth of bronchial epithelial cells on non-treated vs. TC-treated membranes, measured by TEER (Trans Epithelial Electric Resistance). Courtesy of the Department of Biopharmaceutics and Pharmaceutical Technology, University of Saarbruecken.

For advanced light or electron microscopy applications, the membranes can be easily detached from the housing using a scalpel, and once detached, the membrane stays flat and does not curl up, simplifying further manual working steps and avoiding loss of cells. Due to a high chemical resistance to solvents (→ p. A I 8) a broad spectrum of cell fixation protocols can be performed.

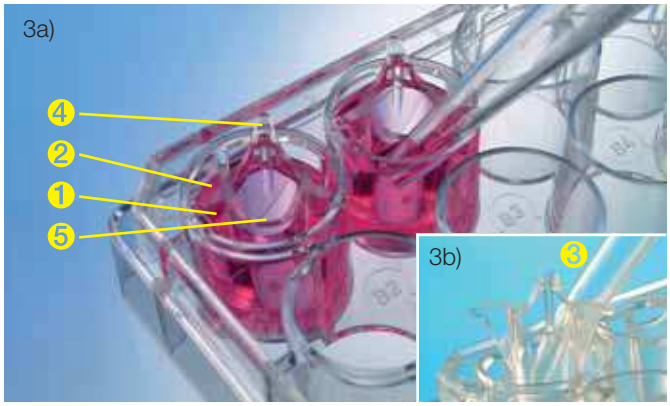

Figure 3a: ThinCert™ cell culture inserts
Figure 3b: "Self-lift" geometry of ThinCert™ cell culture inserts

Figure 4: ThinCert™ cell culture inserts packaging

The specific hanging geometry design of the ThinCert™ cell culture inserts ensures that there is always a gap between the membrane support and the bottom of the well. This avoids damage to the cells growing in the lower compartment. In addition the spacers (Fig. 3a → 1) prevent capillary suction between the side of the well and the ThinCert™ housing. Consequently component exchange between compartments can only take place through the membrane pores.
The ThinCert™ cell culture inserts sit in an eccentric position within the well (Fig. 3a → 2). This specific design gives rise to the so called "self-lift" function, with the insert sliding easily upwards when the pipette is inserted into the lower compartement and gliding back into its original position after the pipette has been withdrawn (Fig. 3b → 3). The largest of three pipetting openings is located opposite of the small conical foot (Fig. 3a → 4). This allows for very convenient pipetting of media or supplements even with the ThinCert™ remaining in the well.

ThinCert™ Cell Culture Inserts

The scalloped rims (Fig. 3a → 5) of the ThinCert™ cell culture inserts allow for flatter pipetting angles. This helps to minimise the risk of contamination as the hand of the user does not remain above the open cell culture. Additionally, the scallops significantly enhance the freedom of movement when pipetting and enhance gas exchange during cultivation.

The sales carton can be used as a donator box (Fig. 4). The required number of ThinCert™ cell culture inserts and CELLSTAR® cell culture plates may conveniently be removed from the donator box, whereas the remaining parts may safely be stored in it.

Which Membrane to use?

General Aspects:

- Small pore sizes (0.4 and 1 µm in diameter) for co-cultivation as well as for transportation, secretion, and diffusion studies of small molecules
- Larger pore sizes (3 and 8 µm in diameter) for migration and invasion studies
- Transparent membranes (in general low pore density) suitable for light and electron microscopy
- Translucent membranes (in general high pore density) suitable for electron microscopy and TEER

	0.4 µm transparent	0.4 µm translucent	1.0 µm transparent	3.0 µm transparent	3.0 µm translucent	8.0 µm translucent
Light microscopy	+	-	+	+	-	+
Electron microscopy	+	+	+	+	+	+
Immunocytochemistry	+	-	+	+	-	+
Trans epithelial electric resistance (TEER)	+	+*	+	+	+*	+*
Transport/diffusion/secretion of small molecules	+	+	+	+	+	+
Transport/diffusion/secretion of large molecules (e.g. macromolecules, viruses)	-	-	-	+	+	+
Co-cultivation	+	+	+	-	-	-
Cell retention/cell barrier function	+	+	+	-	-	-
Migration/chemotaxis/metastasation	-	-	-	+	+	+

+* very suitable
+ suitable
- not suitable

Table 1: Suitability chart of the different ThinCert™ membrane types

ThinCert™ Cell Culture Inserts 6 Well, 12 Well

Features

- Stable clear polystyrene housing
- Hanging geometry
- Sealed PET capillary pore membrane
- Single, sterile blister packing
- Improved cell adhesion through physical surface treatment
- Simplified pipetting due to self-lift geometry
- Enhanced pipetting access and gas exchange

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DNase-free
RNase-free
human DNA-free
non-Pyrogenic

non-cytotoxic

6 well	Cat.-No.	657 640	657 641	657 610	657 630	657 631	657 638
	Pore size [µm]	0.4	0.4	1.0	3.0	3.0	8.0
	Pore density [cm^{-2}]	1 x 10^8	2 x 10^6	2 x 10^6	0.6 x 10^6	2 x 10^6	0.15 x 10^6
	Optical membrane properties	translucent	transparent	transparent	transparent	translucent	translucent
	Culture surface [mm^2]	452.4	452.4	452.4	452.4	452.4	452.4
	Height (overall) [mm]	16.25	16.25	16.25	16.25	16.25	16.25
	Inner/Outer diameter (top) [mm]	24.85/27.85	24.85/27.85	24.85/27.85	24.85/27.85	24.85/27.85	24.85/27.85
	Working volume ThinCert™ [ml]	1.0 – 3.6	1.0 – 3.6	1.0 – 3.6	1.0 – 3.6	1.0 – 3.6	1.0 – 3.6
	Working volume well [ml]	2.0 – 4.15	2.0 – 4.15	2.0 – 4.15	2.0 – 4.15	2.0 – 4.15	2.0 – 4.15
	TC surface treatment/Sterile	+/+	+/+	+/+	+/+	+/+	+/+
	Multiwell plates per box	4	4	4	4	4	4
	ThinCert™ inserts per box	24	24	24	24	24	24

12 well	Cat.-No.	665 640	665 641	665 610	665 630	665 631	665 638
	Pore size [µm]	0.4	0.4	1.0	3.0	3.0	8.0
	Pore density [cm^{-2}]	1 x 10^8	2 x 10^6	2 x 10^6	0.6 x 10^6	2 x 10^6	0.15 x 10^6
	Optical membrane properties	translucent	transparent	transparent	transparent	translucent	translucent
	Culture surface [mm^2]	113.1	113.1	113.1	113.1	113.1	113.1
	Height (overall) [mm]	16.25	16.25	16.25	16.25	16.25	16.25
	Inner/Outer diameter (top) [mm]	13.85/15.85	13.85/15.85	13.85/15.85	13.85/15.85	13.85/15.85	13.85/15.85
	Working volume ThinCert™ [ml]	0.3 – 1.0	0.3 – 1.0	0.3 – 1.0	0.3 – 1.0	0.3 – 1.0	0.3 – 1.0
	Working volume well [ml]	1.0 – 2.0	1.0 – 2.0	1.0 – 2.0	1.0 – 2.0	1.0 – 2.0	1.0 – 2.0
	TC surface treatment/Sterile	+/+	+/+	+/+	+/+	+/+	+/+
	Multiwell plates per box	4	4	4	4	4	4
	ThinCert™ inserts per box	48	48	48	48	48	48

ThinCert™ Cell Culture Inserts

ThinCert™ Cell Culture Inserts 24 Well

Features

- Stable clear polystyrene housing
- Hanging geometry
- Sealed PET capillary pore membrane
- Single, sterile blister packing
- Improved cell adhesion through physical surface treatment
- Simplified pipetting due to self-lift geometry
- Enhanced pipetting access and gas exchange

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DNase-free
RNase-free
human DNA-free
non-Pyrogenic

non-cytotoxic

24 well	Cat.-No.	**662 640**	**662 641**	**662 610**	**662 630**	**662 631**	**662 638**
	Pore size [µm]	0.4	0.4	1.0	3.0	3.0	8.0
	Pore density [cm^{-2}]	1 x 10^8	2 x 10^6	2 x 10^6	0.6 x 10^6	2 x 10^6	0.15 x 10^6
	Optical membrane properties	translucent	transparent	transparent	transparent	translucent	translucent
	Culture surface [mm^2]	31.2	31.2	31.2	31.2	31.2	31.2
	Height (overall) [mm]	16.25	16.25	16.25	16.25	16.25	16.25
	Inner/Outer diameter (top) [mm]	8.4/10.4	8.4/10.4	8.4/10.4	8.4/10.4	8.4/10.4	8.4/10.4
	Working volume ThinCert™ [ml]	0.1 – 0.35	0.1 – 0.35	0.1 – 0.35	0.1 – 0.35	0.1 – 0.35	0.1 – 0.35
	Working volume well [ml]	0.4 – 1.2	0.4 – 1.2	0.4 – 1.2	0.4 – 1.2	0.4 – 1.2	0.4 – 1.2
	TC surface treatment/Sterile	+/+	+/+	+/+	+/+	+/+	+/+
	Multiwell plates per box	2	2	2	2	2	2
	ThinCert™ inserts per box	48	48	48	48	48	48