

MIO-M1 cells

Category

Biological Materials/Cell lines

Spontaneously immortalized human Müller glia cell line

Cells grow indefinitely under adherent conditions in the presence or absence of extracellular matrix proteins. Optimal medium for cell growth: DMEM medium containing high glucose and stable glutamine, supplemented with 10% foetal bovine serum.

Under normal culture conditions, MIO-M1 express markers of mature Müller cells, including cellular retinaldehyde binding protein [CRALBP], glutamine synthetase, vimentin and epidermal growth factor receptor-[EGF-R].

The cells are **NOT** intended for ***Stem cell Research***.

Size: Cells are shipped growing in 25cm² flasks.

If you require more than one unit, please contact us using the button in the sidebar before placing an order.

For commercial use, please contact us using the button in the sidebar to discuss licensing options.

Acknowledgement

Full acknowledgement of the source of the MIO-M1 cells must be given in all relevant publications and presentations of research results.

The following statement must be included in all publications and the accompanying reference must be cited:

'The human Müller cell line Moorfields/Institute of Ophthalmology- Müller 1 (MIO-M1) was obtained from the UCL Institute of Ophthalmology, London, UK.'

The reference is:

'Limb GA, Salt TE, Munro PMG, Moss SE and Khaw PT. (2002) [In vitro characterization of a spontaneously immortalized human Müller cell line \(MIO-M1\)](#). *Investigative Ophthalmology and Visual Science*, 43: 864-869'

How to request a material transfer agreement (MTA) through XIP

To license this product, please select the **appropriate licence option** on the right-hand side of this page. Terms can be previewed from the "Preview terms" link.

MTAs require agreement between all the parties involved in supplying and receiving a product. This cannot happen instantaneously but is a controlled process, managed through XIP and

should not take longer no than 10 business days in ordinary circumstances.

To place an order, please locate the [Sign-in](#) or [Register](#) options on the top right side of this page. You can either sign in to your existing account or register for a new now. **Please note that your account should be created using your academic/ institutional e-mail address.**

For additional guidance on how to create an account and place an order, refer to the [FAQs](#).

References

1. KHAW, MOSS, MUNRO, SALT, LIMB(2002) , In vitro characterization of a spontaneously immortalized human Muller cell line (MIO-M1), Invest Ophthalmol.Vis.Sci. , 43(3), 864-869
2. LIMB, KHAW, LUTHER, REH, KEEGAN, BRATIA, SINGHAI, LAWRENCE , MIO-M1 cells and similar muller glial cell lines derived from adult human retina exhibit neural stem cell characteristics, Stem Cells , 25(8), 2033-2043
3. CURTIS, STITT, UCHIDA, LIMB, MEDINA, ZONG, SYONG(2010) , Evidence supporting a role for N-(3-formyl-3,4-dehydropiperidino)lysine accumulation in Muller glia dysfunction and death in diabetic retinopathy, Mol Vis,, 16, 2524-38
4. STITT, CURTIS, LIMB, YONG, MADDEN, WARD, ZONG(2010) , Hyperglycaemia-induced pro-inflammatory responses by retinal Muller glia are regulated by the receptor for advanced glycation end-products (RAGE), Diabetologia,, 53, 2656-66.
5. MARTIN, LIMB, BULL(2008) , Human Muller stem cell (MIO-M1) transplantation in a rat model of glaucoma: survival, differentiation, and integration, Invest Ophthalmol Vis Sci,, 49, 3449-56
6. BRINGMANN, WIEDEMANN, KOHEN, LIMB, JAHN, HOLLBORN(2004a) , Characterization of the basic fibroblast growth factor-evoked proliferation of the human Muller cell line, MIO-M1, Graefes Arch Clin Exp Ophthalmol,, 242, 414-22
7. BRINGMANN, WIEDEMANN, WOLF, KOHEN, REICHENBACH, LIMB, SCHNURRBUSCH, BIGL, TENCKHOFF, YAFI, IANDIEV, KRAUSSE, HOLLBORN(2004b) , Glial cell expression of hepatocyte growth factor in vitreoretinal proliferative disease, Lab Invest,, 84, 963-72.
8. BRINGMANN, KOHEN, WIEDEMANN, WOLF, REICHENBACH, LIMB, SCHNURRBUSCH, BIEDERMANN, IANDIEV, JAHN, TENCKHOFF, HOLLBORN(2005) , Changes in retinal gene expression in proliferative vitreoretinopathy: glial cell expression of HB-EGF, Mol Vis,, 11, 397-413
9. KOHEN, BRINGMANN, LIMB, WIEDEMANN, REICHENBACH, WAGNER, WURM, DUKIC-STEFANOVIC, RILLICH, ULBRICHT, HOLLBORN(2011) , The human Muller cell line MIO-M1 expresses opsins, Mol Vis,, 17, 2738-50
10. ZHANG, SONG, ZHOU, SUN, YANG, PENG, XIE, LIMB, HU, XIONG, YE, LIU(2014) , IL-1beta Upregulates IL-8 Production in Human Muller Cells Through Activation of the p38 MAPK and ERK1/2 Signaling Pathways, Inflammation, ,
11. KENNEY, KUPPERMANN, LIMB, LUCZY-BACHMAN, GUPTA, MANSOOR(2010) , Protective effects of memantine and epicatechin on catechol-induced toxicity on Muller cells in vitro, Toxicology,, 271, 107-14
12. KENNEY, KUPPERMANN, LIMB, CHWA, FRANCO, PHAM, RAMIREZ(2013) , Hydroquinone induces oxidative and mitochondrial damage to human retinal Muller cells (MIO-M1), Neurotoxicology,, 39, 102-8