Human Renal Glomerular Endothelial Cells (HRGEC)

Catalog #4000

Cell Specification

Renal glomerular endothelial cells (GEC) are a specialized microvascular cell type involved in the regulation of glomerular ultrafiltration. They form the inner part of the filtration barrier and are involved in pathophysiological processes in the glomerulum [1]. GEC constitutively produce bio-active molecules, which can be amplified by inflammatory and thrombotic molecules [2]. Endothelial cell injury due to a severe glomerular lesion can inhibit angiogenesis and result in sclerosis at the injured site [3,4]. GEC injury affects mesangial and epithelial cells and leads to the progression of renal disease [4]. The biological properties of GEC remain largely unknown because of difficulties associated with the culturing, cloning and propagation of these cells.

HRGEC from ScienCell Research Laboratories are isolated from human kidneys. HRGEC are cryopreserved after purification and delivered frozen. Each vial contains >5 x 10^5 cells in 1 ml volume. HRGEC are characterized by immunofluorescence with antibodies specific to vWF/Factor VIII and CD31 (PECAM). HRGEC are negative for HIV-1, HBV, HCV, mycoplasma, bacteria, yeast and fungi. HRGEC are guaranteed to expand beyond 15 population doublings under the conditions specified by ScienCell Research Laboratories.

Recommended Medium

It is recommended to use Endothelial Cell Medium (ECM, Cat. #1001) for the culturing of HRGEC *in vitro*.

Product Use

HRGEC are for research use only. They are not approved for human or animal use, or for application in *in vitro* diagnostic procedures.

Storage

Upon receiving, directly and immediately transfer the cells from dry ice to liquid nitrogen and keep the cells in liquid nitrogen until they are needed for experiments.

Shipping

Dry ice.

References

[1] Nangaku M, Shankland SJ, Couser WG, and Johnson RJ. (1998) "A new model of renal microvascular injury." *Curr Opin Nephrol Hypertens.* 7(4):457-62.

[2] Kester M, Nowinski RJ, Holthofer H, Marsden PA, Dunn MJ. (1994) "Characterization of platelet-activating factor synthesis in glomerular endothelial cell lines." *Kidney Int.* 46(5):1404-12.

[3] Lee LK, Meyer TW, Pollock AS, Lovett DH. (1995) "Endothelial cell injury initiates glomerular sclerosis in the rat remnant kidney." *J Clin Invest.* 96(2):953-64.

[4] Yamanaka N, Shimizu A. (1999) "Role of glomerular endothelial damage in progressive renal disease." *Kidney Blood Press Res.* 22(1-2):13-20.

Instructions for culturing cells

Caution: Cryopreserved cells are very delicate. Thaw the vial in a 37°C water bath and return the cells to culture as quickly as possible with minimal handling!

Initiating the culture:

1. Prepare a fibronectin-coated culture vessel (2 µg/cm^2, T-75 flask is recommended). Add 5 ml of sterile Dulbecco's phosphate buffered saline, Ca^{++}- and Mg^{++}-free (Cat. #0303) to a T-75 flask and then add 150 µl of fibronectin stock solution (Cat. #8248). Leave the vessel in a 37°C incubator overnight.
2. Prepare complete medium. Decontaminate the external surfaces of medium bottle and medium supplement tubes with 70% ethanol and transfer them to a sterile field. Aseptically transfer supplement to the basal medium with a pipette. Rinse the supplement tube with medium to recover the entire volume.
3. Aspirate fibronectin solution and add 15 ml of complete medium to the culture vessel. The fibronectin solution can be used twice. Leave the vessel in the sterile field and proceed to thaw the cryopreserved cells.
4. Place the frozen vial in a 37°C water bath. Hold and rotate the vial gently until the contents completely thaw. Promptly remove the vial from the water bath, wipe it down with 70% ethanol, and transfer it to the sterile field.
5. Carefully remove the cap without touching the interior threads. Gently resuspend and dispense the contents of the vial into the equilibrated, fibronectin-coated culture vessel. A seeding density of 5,000-7,000 cells/cm^2 is recommended.

   Note: Dilution and centrifugation of cells after thawing are not recommended since these actions are more harmful to the cells than the effect of residual DMSO in the culture. It is also important that cells are plated in fibronectin-coated culture vessels to promote cell attachment.
6. Replace the cap or lid of the culture vessel and gently rock the vessel to distribute the cells evenly. Loosen cap, if necessary, to allow gas exchange.
7. Return the culture vessel to the incubator.
8. For best results, do not disturb the culture for at least 16 hours after the culture has been initiated. Refresh culture medium the next day to remove residual DMSO and unattached cells, then every other day thereafter.

Maintaining the culture:

1. Refresh supplemented culture medium the next morning after establishing a culture from cryopreserved cells.
2. Change the medium every three days thereafter, until the culture is approximately 70% confluent.

3. Once the culture reaches 70% confluency, change medium every other day until the culture is approximately 90% confluent.

Subculturing:

1. Subculture when the culture reaches 90% confluency.
2. Prepare fibronectin-coated culture vessels (2 μg/cm^2) one day before subculture.
3. Warm complete medium, trypsin/EDTA solution (T/E, Cat. #0103), T/E neutralization solution (TNS, Cat. #0113), and DPBS (Ca^{++}- and Mg^{++}-free, Cat. #0303) to **room temperature**. We do not recommend warming reagents and medium in a 37ºC water bath prior to use.
4. Rinse the cells with DPBS.
5. Add 10 ml of DPBS and then 1 ml of T/E solution into flask (in the case of a T-75 flask). Gently rock the flask to ensure complete coverage of cells by T/E solution. Incubate the flask in a 37ºC incubator for 1 to 2 minutes or until cells completely round up. Use a microscope to monitor the change in cell morphology.
6. During incubation, prepare a 50 ml conical centrifuge tube with 5 ml of fetal bovine serum (FBS, Cat. #0500).
7. Transfer T/E solution from the flask to the 50 ml centrifuge tube (a small percent of cells may detach) and continue to incubate the flask at 37ºC for another 1 to 2 minutes (no solution in the flask at this moment).
8. At the end of incubation, gently tap the side of the flask to dislodge cells from the surface. Check under a microscope to make sure that all cells detach.
9. Add 5 ml of TNS solution to the flask and transfer detached cells to the 50 ml centrifuge tube. Rinse the flask with another 5 ml of TNS to collect the residual cells.
10. Examine the flask under a microscope for a successful cell harvest by looking at the number of cells being left behind; there should be less than 5%.

    Note: Use ScienCell T/E solution that is optimized to minimize cell damages due to over trypsinization.
11. Centrifuge the 50 ml centrifuge tube at 1000 rpm for 5 minutes. Resuspend cells in culture medium.
12. Count and plate cells in a new fibronectin-coated culture vessel with the recommended cell density.
13. Subculture the cells when they are over 90% confluent.

Caution: Handling human derived products is potentially biohazardous. Although each cell strain tests negative for HIV, HBV and HCV DNA, diagnostic tests are not necessarily 100% accurate, therefore, proper precautions must be taken to avoid inadvertent exposure. Always wear gloves and safety glasses when working with these materials. Never mouth pipette. We recommend following the universal procedures for handling products of human origin as the minimum precaution against contamination [1].

[1] Grizzle WE, Polt S. (1988) "Guidelines to avoid personal contamination by infective agents in research laboratories that use human tissues." *J Tissue Culture Methods*. 11: 191-9.