Endothelial Progenitor Cells

Introduction

The endothelial progenitor cell (EPC) is a primitive cell type in the endothelial lineage. They are bone marrow derived cells with properties similar to those of embryonic angioblasts. These progenitor cells migrate into the blood stream and are able to differentiate into a variety of mature vascular endothelial cell types.

EPC play an important role in both angiogenesis and vasculogenesis. Recent evidence has suggested the involvement of EPC in tumor growth and metastasis. In vitro, EPC invade into breast and ovarian cancer cell clusters, whereas human microvascular endothelial cells (HMVEC) do not. In vivo, change in EPC number has been associated with lymphoma, multiple myeloma, Lewis lung tumor, and hepatocellular carcinoma (HCC). Interestingly, EPC are more similar to human tumor endothelial cells in their gene expression patterns than human umbilical vein endothelial cells (HUVEC) or HMVEC, the two widely used cell types for antiangiogenic drug screening. For example, EPC express tumor endothelial marker 7 (TEM-7), which is elevated in human colorectal cancer endothelium, but HMVEC or HUVEC do not. Compared to specific mature types of endothelial cells such as HMVEC and HUVEC, EPC are more suitable for cell-based screening of anti-cancer drugs.

Alteration in EPC number and function has also been observed in pathogenesis of a variety of diseases such as coronary artery disease (CAD), ischemia, pulmonary hypertension, cerebral vascular disease, acute myocardial infarction, diabetes mellitus, arthritis, and wound healing. In addition, EPC have impact on aging and smoking-related diseases, suggesting potential uses of EPC in these areas.

Features of EPC:

- Human primary cells
- Progenitor cells, not terminally differentiated mature endothelial cells such as HUVEC and HMVEC
- Capable of differentiating into specific subtypes of endothelial cells such as vein endothelial cells, microvascular endothelial cells and aortic endothelial cells
- Gene expression pattern is more similar to that of endothelial cells from tumors
- Specifically migrate to human tumors
- Quantity and functions in the human blood is altered during pathogenesis of a variety of human diseases

Application:

EPC is a unique primitive cell type and is involved in a variety of human diseases. Isolated human EPC can be used in research and drug discovery in the following areas:

- Cancers such as lymphoma, breast cancer, lung cancer and inoperable hepatocellular carcinoma (HCC)
- Vascular diseases such as coronary artery disease (CAD) and acute myocardial infarction.
- Diabetes Mellitus
- Ischemia
- Pulmonary hypertension
- Cerebral vascular disease
- Arthritis
- Cutaneous wound healing and skin regeneration
Specification and Characterization of BioChain’s EPC

EPC from BioChain are isolated from human samples using our proprietary technology. EPC are delivered at the 4th passage, either as cryopreserved or proliferating cells in culture flasks. Each cryovial contains >5 x 10^5 cells in 1 ml volume. 24-, 96-, or 384-well formats, ready for screening, are also available upon request. Except for the common endothelial cell cobblestone morphology (Figure 1), BioChain’s EPC are characterized and quality-controlled by vWF/Factor VIII immunostaining (Figure 2), LDL uptake and lectin binding (Figure 4). Human donors are negative for HIV-1, HBV and HCV, and detailed donor profiles are available upon request. Our EPC are guaranteed to further expand for at least 4-5 population doublings at the conditions provided by BioChain.

We have received positive feedback on our EPC from academic and industrial users. In the bead sprouting assay, although HUVEC sprouted more; our EPC sprouting looked more like real vessels and formed a lumen-like structure. In the tube formation co-culture assay, our EPC formed longer and thicker capillary tubes, more like a real capillary when compared to HUVEC. Also, our EPC out-performed HUVEC in the migration assay, responding to VEGF induction in a concentration-dependent manner with a low basal migration.
EPC Product Price List

<table>
<thead>
<tr>
<th>Cat. #</th>
<th>Product Description</th>
<th>Unit / Qty</th>
<th>£</th>
<th>CHF</th>
<th>€</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z7030003</td>
<td>Human EPC growth medium</td>
<td>500 ml</td>
<td>160</td>
<td>310</td>
<td>290</td>
</tr>
<tr>
<td>Z7030004</td>
<td>Human EPC basal medium</td>
<td>500 ml</td>
<td>90</td>
<td>170</td>
<td>160</td>
</tr>
<tr>
<td>Z7030005</td>
<td>Human EPC growth medium supplements</td>
<td>25 ml</td>
<td>100</td>
<td>190</td>
<td>170</td>
</tr>
<tr>
<td>Z7030006</td>
<td>Human EPC freezing medium</td>
<td>50 ml</td>
<td>80</td>
<td>150</td>
<td>140</td>
</tr>
<tr>
<td>Z7030001</td>
<td>Cryopreserved EPC - Human Adult Normal</td>
<td>0.5 x 10^6 cells</td>
<td>460</td>
<td>910</td>
<td>850</td>
</tr>
<tr>
<td>Z7030002-1</td>
<td>Proliferating EPC in T25 - Human Adult Normal</td>
<td>1 x 10^6 cells</td>
<td>910</td>
<td>1820</td>
<td>1700</td>
</tr>
<tr>
<td>Z7030002-2</td>
<td>Proliferating EPC in T75 - Human Adult Normal</td>
<td>2 x 10^6 cells</td>
<td>1460</td>
<td>2920</td>
<td>2720</td>
</tr>
<tr>
<td>Z7030002-3</td>
<td>Proliferating EPC in T125 - Human Adult Normal</td>
<td>3 x 10^6 cells</td>
<td>2010</td>
<td>4010</td>
<td>3740</td>
</tr>
<tr>
<td>Z7030002-4</td>
<td>Proliferating EPC in T225 - Human Adult Normal</td>
<td>4 x 10^6 cells</td>
<td>2640</td>
<td>5280</td>
<td>4930</td>
</tr>
</tbody>
</table>

References


