

## Small Intestine Epithelial Cells



### Tools for Diabetes and Weight Control Research: **Functional Human Intestinal Epithelial Cells**

Intestine epithelial cells play important functions in the maintenance of overall individual health. In addition to their primary roles in absorbing nutrients and in serving as a physical barrier between the outside world and the inside environment, intestine epithelial cells are crucial in maintaining homeostasis of the mammalian immune and endocrine system in the context of health and disease (1). A failing intestine epithelium can lead to various disorders such as hormonal imbalance, inflammatory bowel disease (IBD), weight gain, and diabetes. Thus insights into the mechanisms of and remedies for those disorders can be gained from in vitro systems offered by the availability of human intestine epithelial cells.

DV Biologics is dedicated to offer scientists and researchers the highest quality cells, genomic and proteomic biological products. They consist of human derived primary cells, total RNA, cDNA and protein lysates, spanning various developmental stages. All products are validated under strict quality assurance and control parameters, providing customers with reliable, quality products for reproducible results with maximum impact. Unless specified, each product is from a single donor.

Featured in this newsletter are two cellular products: Whole small intestine cells (PB-PB-PD007-F) and small intestine epithelial cells (PB-PB-PD015-F) which are designed to facilitate your diabetes and weight control research needs. As one of the routine validation procedures of our cellular products, the growth characteristics of small intestine epithelial cells are determined, indicating that PB-PB-PD015-F cells can proliferate in culture with appropriate medium (PB-D-Pro-015) for at least four passages, totaling over seven population doublings (Fig. 1) while maintaining their phenotypic and genotypic characteristics. More importantly, the whole small intestine cells and small intestine epithelial cells express molecular markers indicative of the presence of stem cells (LGR5, OLFM4, PHLDA1, NOTCH1, SOX9), epithelial cells (CK18, CDH1), and entero-endocrine cells (GPR120, GLP1) (Fig. 2). Of notable interest is the expression of PHLDA1, a marker for intestinal epithelial stem cells (3). Functionally, PB-PD015-F cells secrete glucagon-like peptide 1 (GLP1), an insulinotropic factor, in response to glucose, or to the combined effect of the anti-diabetic compound tolbutamide, a potassium channel blocker, and the elevation of intracellular cAMP level, induced by forskolin and IBMX (Fig. 3). Since GLP1 may play an important role in obesity (2), PB-PD015-F cells may be a valuable tool for diabetes and weight control research.

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2. Ranganath LR, Beety JM, Morgan LM, Wright JW, Howland R, and Marks V. 1996.

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3. Sakthianandeswaren A, Christie M, D'Andreti C, Tsui C, Jorissen RN, Li S, Fleming NI, Gibbs P, Lipton L, Malaterre J, Ramsay RG, Pheese TJ, Ernst M, Jeffery RE, Poulosom R, Leedham SJ, Segditsas S, Tomlinson IP, Bernhard OK, Simpson RJ, Walker F, Faux MC, Church N, Catimel B, Flanagan DJ, Vincan E, and Sieber OM. 2011.

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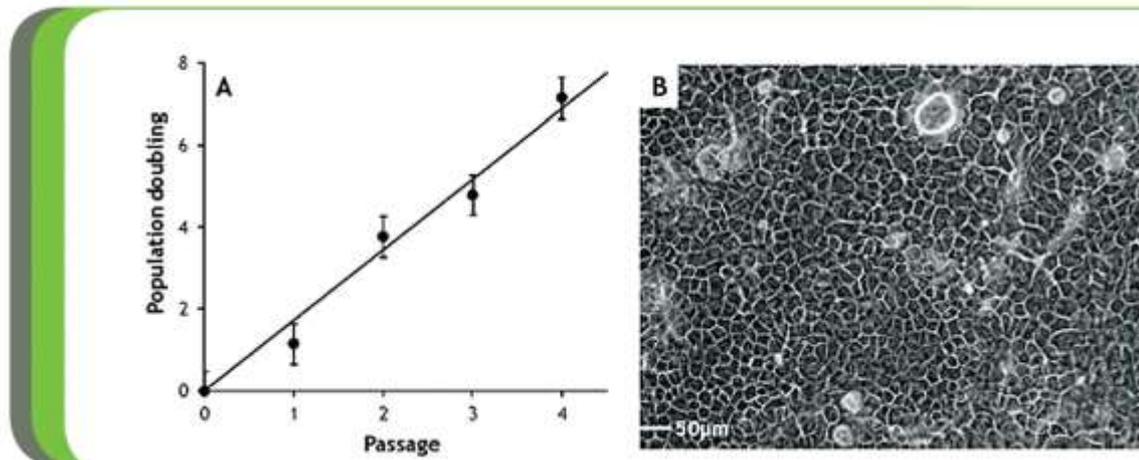


Fig. 1: **Growth characteristics of DV Biologics small intestine epithelial cells (PB-PB-PD015-F).** **A: Growth curve:** Cells were grown in Epithelial Pro-Conditioned Medium (PB-D-Pro-015) in vessels pre-coated with Culture Vessel Coating Solution (PB-CCS102), dissociated with Cell Dissociation Solution (PB-CCS101) every 7day period, and counted. The results indicate that DV Biologics small intestine epithelial cells (PB-PB-PD015-F) proliferate in culture for at least four passages, totaling over 7 population doublings. **B: Phase contrast photomicrograph:** PB-PB-PD015-F cells maintain the typical epithelial morphology at passage 4.

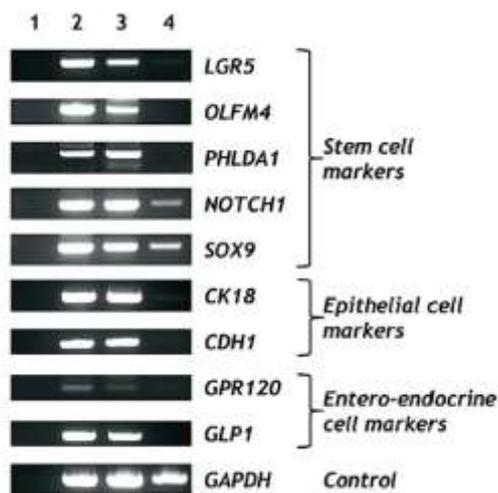


Fig.2: **Characterization of DV Biologics small intestine cells by RT-PCR.** Whole small intestine cells (PB-PD007-F, Lane 2), and small intestine epithelial cells (PB-PD015F, passage 4; Lane 3) express the characteristic markers of stem cells, including PHLDA1, an epithelial stem cell marker (3); of epithelial cells (CK18, cytokeratin 18; CDH1, E-cadherin); and of entero-endocrine cells. Lane 1: No RT control. Lane 4: Brain tissue (PB-AN001-F).

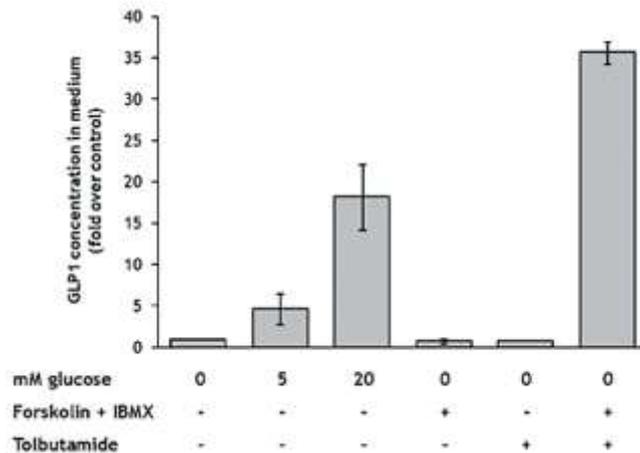


Fig.3: **DV Biologics small intestine epithelial cells (PB-PD015-F) secretes GLP1.** PB-PD015 cells were incubated at 37°C, 2h, in RBB (PBS supplemented with 1.2mM MgCl<sub>2</sub>, 2.5mM CaCl<sub>2</sub>, and 0.5% BSA) containing various combinations of additives. Forskolin, IBMX, and tolbutamide were used at 10µM, each. GLP1 in the clarified supernatant was quantified by ELISA. The results indicate that PD015 cells secrete GLP1 in a dose dependent fashion in response to glucose. This GLP1 secretion is also activated by the combined actions of the potassium channel blocker, tolbutamide, and an elevated intracellular cAMP pool, induced by forskolin and IBMX. Error bar = ± Standard deviation.

Product Description	Unit size	Cat#
Human whole small intestine cells	5 x 10 <sup>6</sup> cells/vial	PB-PD007-f
Human small intestine epithelial cells	5 x 10 <sup>6</sup> cells/vial	PB-PD015-f
Human whole intestine tissue lysate, prenatal	100µg	PB-PD006-L
Human whole intestine RNA, prenatal	10µg	PB-PD006-R
Human whole intestine cDNA, prenatal	20 reactions	PB-PD006-CD
Human whole intestine frozen tissue block, prenatal	1 block	PB-PD006-FS
Human whole small intestine cells, prenatal	5.0×10 <sup>5</sup>	PB-PD007-F
Human whole small intestine tissue lysate, prenatal	100µg	PB-PD007-L
Human whole small intestine RNA, prenatal	10µg	PB-PD007-R
Human whole small intestine cDNA, prenatal	20 reactions	PB-PD007-CD
Human whole small intestine frozen tissue block, prenatal	1 block	PB-PD007-FS
Human small intestine epithelial cells, prenatal	5.0×10 <sup>5</sup>	PB-PD015-F
Human small intestine epithelial cell pellet, prenatal	2.5×10 <sup>6</sup>	PB-PD015-CP
Human small intestine epithelial cell RNA, prenatal	10µg	PB-PD015-R
Human small intestine epithelial cell cDNA, prenatal	20 reactions	PB-PD015-CD
Human whole large intestine cells, prenatal	5.0×10 <sup>5</sup>	PB-PD008-F
Human whole large intestine tissue lysate, prenatal	100µg	PB-PD008-L
Human whole large intestine RNA, prenatal	10µg	PB-PD008-R
Human whole large intestine cDNA, prenatal	20 reactions	PB-PD008-CD
Cell dissociation solution	20ml	PB-CCS101
Culture vessel coating solution	10ml	PB-CCS102
Epithelial Pro-Conditioned Media	100ml	PB-D-PRO-015-100
Epithelial Pro-Conditioned Media	50ml	PB-D-PRO-015-50
Epithelial Pro-Conditioned Media	25ml	PB-D-PRO-015-25
<b>ELISA Kits</b>		
Human glucagon-like peptide 1 receptor (GLP1R) ELISA kit	96 T	PB-CSB-E17869h
Human glucagon-like peptide 2 receptor (GLP2R) ELISA kit	96 T	PB-CSB-E17870h
Human Glucagon,GC ELISA Kit	96 T	PB-CSB-E09207h
Human glucagon like peptide 2(GLP2) ELISA kit	96 T	PB-CSB-EQ027317HU
<b>MicroMatrix Arrays of MicroStem Inc.</b>		
MicroMatrix ECMP Array	1 pcs	PB-MM012011
MicroMatrix ECMP Array	4 pcs	PB-MM012011-4
cStem™ Pluripotency System	1 pcs	PB-CM502012
cStem™ Pluripotency Array	1 pcs	PB-CM502012-1
cStem™ Pluripotency Array	5 pcs	PB-CM502012-5