

## Human Primary and Cultured Cells – Tools for Toxicology Studies



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## Human Primary and Cultured Cells

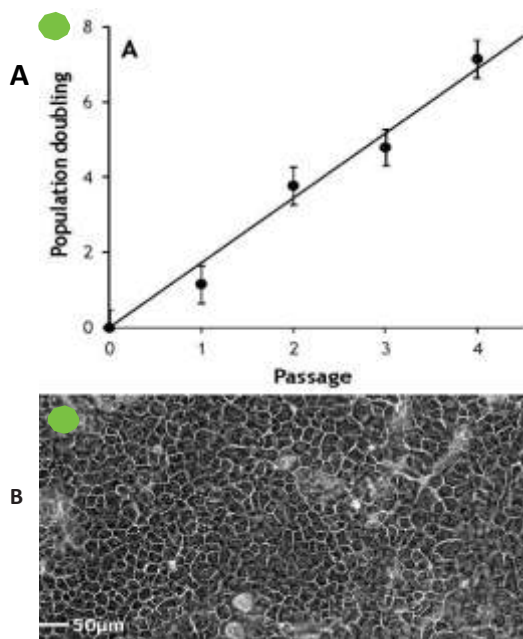
Unbeknownst to many, in the course of their daily activities, people necessarily come in contact with a multitude of chemicals that may adversely affect their well being. For instance, a class of organic compounds known as phthalates, which are an additive present in a wide variety of products such as medications, medical products, food packaging, detergents, cosmetics, personal care products, toys, paints, and adhesives, have raised concern as they may be implicated in causing endocrine disruption leading to metabolic dysfunction. More informative characterization of the effects of such chemicals on humans can only come from extensive testing in cellular systems which closely reproduce the various organ and tissue systems of the human body. Due to the myriad of novel synthetic substances that are introduced at an ever increasing rate, not only do such testing platforms have to be effective, they need to be economical, reliable, and adaptable to high throughput protocols. At DV Biologics, our team of scientists are dedicated to providing various toxicology laboratories with the distinct cellular tools, often customized to specific parameters, that are needed in the characterization of novel molecules. DV Biologics is a global supplier of human biological tools to academic institutions and pharmaceutical companies engaging in cell- and drug-based discovery, testing and development. Our mission is to provide biological tools needed to advance the innovation of technology that will ultimately be used to treat or prevent many different human degenerative disorders and diseases. In addition to an expanding product portfolio of unique cell types and tissue-derived products, DV Biologics offers a diverse range of novel human biological tools and services that can be used to advance the toxicology knowledge base of biomolecules. We guarantee our products are of the highest quality. DV Biologics offers many cellular products suitable for toxicological studies such as liver cells (PB-PD001-F), kidney cells (PB-PU001-F), neural cells. (PB-PN001-F), cardiomyocytes (PB-AC008-F), large intestine cells (PB-PD008-F), and small intestine cells (PB-PD007-F) (Table 1). Of particular interest are the small intestine epithelial cells (PB-PD015-F), which can be expanded for no fewer than 7 population doublings (Fig. 1A), while maintaining their characteristic morphology (Fig. 1B) and molecular markers (Stem cell markers: LGR5, OLFM4, PHLDA1, NOTCH1, SOX9; epithelial cell markers: CK18, CDH1; entero-endocrine cell markers: GPR120, GLP1; DV Biologics Newsletter Fall 2012). The functionality of PB-PD015-F cells is evident by their ability to secrete glucagon-like peptide 1 (GLP1) upon stimulation by glucose or cAMP-elevating

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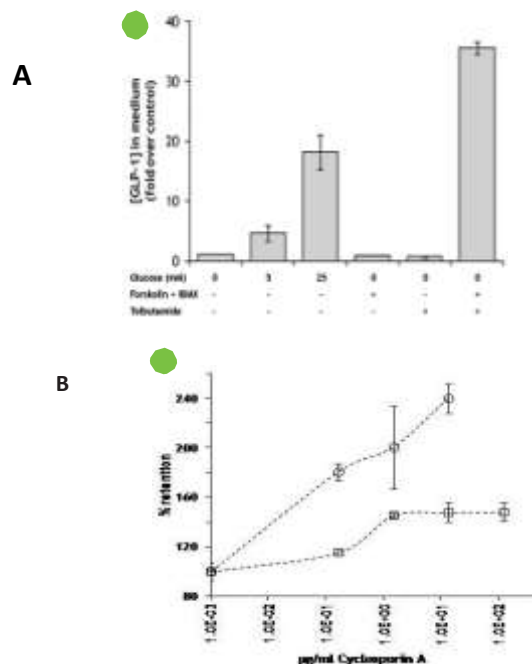
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agents (Fig. 2A). PB-PD015-F cells also display a P-glycoprotein (Pgp) transporter activity, which is more susceptible to inhibition by cyclosporin A than the activity found in Caco 2 cells (Fig. 2B), making PB-PD015-F cells a more physiologically relevant model for anti-cancer drug toxicology screening. As current trends point to complementary and alternative medicine, the use of complex natural products presents a unique challenge for toxicology studies, which in turn necessitates the use of cellular models that best represent a physiological setting. DV Biologics currently offers an extensive array of tools which enables researchers to conduct relevant toxicology investigation. Table 1 lists representative products that DV Biologics offers in the research field of toxicology. Please refer to our catalog for a more comprehensive list as well as units of measure (U/M). If you don't see the products you are looking for, please inquire so that we may obtain the items that your research requires.

1. Ranganath LR, et al. 1996. Attenuated GLP-1 secretion in obesity: Cause or consequence? *Gut* 38:916.
2. Sakthianandeswaren A, et al. 2011. PHLDA1 expression marks the putative epithelial stem cells and contributes to intestinal tumorigenesis. *Cancer Res.* 71:3709.



**Fig.:1** Growth characteristics of DV Biologics small intestine epithelial cells (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 7 day period, and counted. The results indicate that DV Biologics small intestine epithelial cells (PB-PD015-F) proliferate in culture for at least four passages, totaling over 7 population doublings.  
**B: Phase contrast photomicrograph:** PB-PD015-F cells maintain the typical epithelial morphology at passage 4.



**Fig.: 2** Functional characterization of intestinal epithelial cells (PB-PD015-F).  
**A:** Secretion of glucagon-like peptide 1 (GLP-1). PB-PD015-F cells were incubated in assay buffer for 2 h, then induced by a combination of glucose, forskolin, isobutylmethylxanthine (IBMX), and tolbutamide as indicated for 2 h. Forskolin, IBMX, and tolbutamide: 10, 10, and 500 µmol/l, respectively. The clarified supernatants were assayed by ELISA for GLP-1, and the results normalized to no glucose control. Error bar: ± SEM.  
**B:** Calcein-AM retention. PB-PD015-F cells (□) and Caco-2 cells (○) were incubated in various concentrations of cyclosporin A for 15 min, exposed to 0.25 µmol/l calcein-AM for 15 min, washed twice, and fluorescence was quantified. The results were normalized to no cyclosporin A control. Error bar: ± SEM.

Product	Quantity	Cat#
Human Umbilical Vein Endothelial Cells	0.5 × 10 <sup>6</sup> cells/vial	PB-AC005-F
Human Umbilical Cord Cells (Wharton's Jelly)	0.5 × 10 <sup>6</sup> cells/vial	PB-AC006-F
Human Cardiomyocytes	0.5 × 10 <sup>6</sup> cells/vial	PB-AC008-F
Human Cardiac Stromal Cells	0.5 × 10 <sup>6</sup> cells/vial	PB-AC009-F
Human Umbilical Cord Blood Mononuclear Cells	2.5 × 10 <sup>6</sup> cells/vial	PB-AC014-F-2.5
Human Umbilical Cord Blood Mononuclear Cells	10 × 10 <sup>6</sup> cells*	PB-AC014-F-10
Human Umbilical Cord Blood Mononuclear Cells	25 × 10 <sup>6</sup> cells*	PB-AC014-F-25
Human Cardiac Progenitor Cells	0.5 × 10 <sup>6</sup> cells/vial	PB-AC015-F
Human Valvular Interstitial Cells	0.5 × 10 <sup>6</sup> cells/vial	PB-AC024-F
Human Bone Marrow Mononuclear Cells	2.5 × 10 <sup>6</sup> cells/vial	PB-AH002-F-2.5
Human Bone Marrow Mononuclear Cells	10 × 10 <sup>6</sup> cells*	PB-AH002-F-10
Human Bone Marrow Mononuclear Cells	25 × 10 <sup>6</sup> cells*	PB-AH002-F-25
Human Bone Marrow Stromal Cells	0.5 × 10 <sup>6</sup> cells/vial	PB-AH005-F
Human Skin Cells (fibroblasts)	0.5 × 10 <sup>6</sup> cells/vial	PB-AI001-F
Human Skeletal Muscle Progenitor Cells (Myoblasts)	0.5 × 10 <sup>6</sup> cells/vial	PB-AM002-F
Human Skeletal Muscle Cells	0.5 × 10 <sup>6</sup> cells/vial	PB-AM003-F
Human Osteoblasts	0.5 × 10 <sup>6</sup> cells/vial	PB-AM005-F
Human Gonadal Stromal Cells	0.5 × 10 <sup>6</sup> cells/vial	PB-AR005-F
Human Endometrial Menstrual Cells	0.5 × 10 <sup>6</sup> cells/vial	PB-AR007-F
Human Cardiac Cells (uncultured)	0.5 × 10 <sup>6</sup> cells/vial	PB-PC001-F
Human Cardiomyocytes	0.5 × 10 <sup>6</sup> cells/vial	PB-PC008-F
Human Cardiac Progenitor Cells	0.5 × 10 <sup>6</sup> cells/vial	PB-PC015-F
Human Aortic Cells	0.5 × 10 <sup>6</sup> cells/vial	PB-PC016-F
Human Whole Liver Cells (uncultured)	0.5 × 10 <sup>6</sup> cells/vial	PB-PD001-F
Human Whole Stomach Cells (uncultured)	0.5 × 10 <sup>6</sup> cells/vial	PB-PD005-F
Human Whole Small Intestine Cells (uncultured)	0.5 × 10 <sup>6</sup> cells/vial	PB-PD007-F
Human Whole Large Intestine Cells (uncultured)	0.5 × 10 <sup>6</sup> cells/vial	PB-PD008-F
Human Whole Tongue Cells (uncultured)	0.5 × 10 <sup>6</sup> cells/vial	PB-PD009-F
Human Endothelial Liver Cells	0.5 × 10 <sup>6</sup> cells/vial	PB-PD012-F
Human Small Intestine Epithelial Cells	0.5 × 10 <sup>6</sup> cells/vial	PB-PD015-F
Human Esophagus Epithelial Cells	0.5 × 10 <sup>6</sup> cells/vial	PB-PD016-F
Human Whole Muscle Cells (uncultured)	0.5 × 10 <sup>6</sup> cells/vial	PB-PM001-F
Human Skeletal Muscle Progenitor Cells (Myoblasts)	0.5 × 10 <sup>6</sup> cells/vial	PB-PM002-F
Human Skeletal Muscle Cells (cultured)	0.5 × 10 <sup>6</sup> cells/vial	PB-PM003-F
Human Osteoblasts	0.5 × 10 <sup>6</sup> cells/vial	PB-PM005-F
Human Neural Cells	0.5 × 10 <sup>6</sup> cells/vial	PB-PN001-F
Human Neural Progenitor Cells	0.5 × 10 <sup>6</sup> cells/vial	PB-PN003-F
Human Whole Kidney Cells (uncultured)	0.5 × 10 <sup>6</sup> cells/vial	PB-PU001-F
Human Kidney Epithelial Cells	0.5 × 10 <sup>6</sup> cells/vial	PB-PU002-F
Cardiomyocyte Cellutions™ Maintenance Medium	500 ml	PB-C-Main-001-500
Cardiomyocyte Cellutions™ Differentiation Medium	100 ml	PB-C-MDiff-001-100
Cardiomyocyte Cellutions™ Differentiation Medium	500 ml	PB-C-MDiff-001-500

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Cardiac Cellutions™ Medium	500 ml	PB-C-MGro-001-500
Epithelial Pro-Conditioned Cellutions™ Medium	25 ml	PB-D-Pro-015-25
Epithelial Pro-Conditioned Cellutions™ Medium	50 ml	PB-D-Pro-015-50
Epithelial Pro-Conditioned Cellutions™ Medium	100 ml	PB-D-Pro-015-100
Muscle Cellutions™ Differentiation Medium	100 ml	PB-M-Diff-001-100
Muscle Cellutions™ Differentiation Medium	500 ml	PB-M-Diff-001-500
Muscle Cellutions™ Medium	500 ml	PB-M-Gro-001-500
Neural Pro-Conditioned Medium	25 ml	PB-N-Pro-001-25
Neural Pro-Conditioned Medium	50 ml	PB-N-Pro-001-50
Neural Pro-Conditioned Medium	100 ml	PB-N-Pro-001-100
Osteoblast Cellutions™ Medium	100 ml	PB-O-Gro-001-100
Osteoblast Cellutions™ Medium	500 ml	PB-O-Gro-001-500
Cell Dissociation Solution	20 ml	PB-CCS101
Culture Vessel Coating Solution	10 ml	PB-CCS102

\*May ship in multiple vials

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