**ATCC® HUMAN PRIMARY CELLS**

- **Aortic Endothelial Cells**
- **Aortic Smooth Muscle Cells**
- **Coronary Artery Endothelial Cells**
- **Coronary Artery Smooth Muscle Cells**
- **Pulmonary Artery Endothelial Cells**
- **Pulmonary Artery Smooth Muscle Cells**
- **Lung Smooth Muscle Cells**
- **Lung Fibroblasts**
- **Small Airway Epithelial Cells**
- **Bronchiolar/Tracheal Epithelial Cells**
- **Bronchiolar/Tracheal Smooth Muscle Cells**
- **Disease Airway Cells**
- **Bladder Epithelial Cells (A/T/N)**
- **Bladder Smooth Muscle Cells**
- **Bladder Fibroblast Cells**
- **Prostate Epithelial Cells**
- **Prostate Smooth Muscle Cells**
- **Vaginal Endometrial Cells**
- **Vaginal Epithelial Cells**
- **Bone Marrow CD34+ Cells**
- **Bone Marrow-Derived Mesenchymal Stem Cells**
- **Uterine Fibroblast Cells**
- **Uterine Smooth Muscle Cells**
- **Mammary Epithelial Cells**
- **Bone Marrow CD34+ Cells**
- **Cord Blood CD34+ Cells**
- **Cord-derived Mesenchymal Stem Cells**
- **Dermal Microvascular Endothelial Cells**
- **Dermal Fibroblasts**
- **Epidermal Keratinocytes, Adult & Neonatal**
- **Epidermal Melanocytes, Adult & Neonatal**
- **Pre-adipocytes**
- **Adipose-derived Mesenchymal Stem Cells**
- **Corneal Epithelial Cells**
- **Gingival Fibroblasts**
- **Gingival Keratinocytes**
- **Peripheral Blood Mononuclear Cells (PBMC)**
- **Peripheral Blood CD14+ Monocytes**
- **Peripheral Blood CD4+ Cells**
- **Peripheral Blood CD8+ Cells**
- **Peripheral Blood CD19+ Cells**
- **Peripheral Blood CD56+ Cells**
- **Primary Cord Blood CD34+ Cells**
- **Cord Blood CD34+ Cells**
- **Cord-derived Mesenchymal Stem Cells**
- **Peripheral Blood Mononuclear Cells**
- **Peripheral Blood CD14+ Monocytes**
- **Peripheral Blood CD4+ Cells**
- **Peripheral Blood CD8+ Cells**
- **Peripheral Blood CD19+ Cells**
- **Peripheral Blood CD56+ Cells**
- **Primary Cord Blood CD34+ Cells**
- **Cord Blood CD34+ Cells**
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- **Bone Marrow Mononuclear Cells**
- **Bone Marrow-Derived Mesenchymal Stem Cells**
- **Hepatocytes: Characterized**

**WHAT ARE HUMAN PRIMARY CELLS?**
- Untransformed
- May display similar gene expression as cells in situ
- Many similar physiologic functions as in vivo
- Indispensable for a wide range of experiments
- Ideal to examine physiology or disease pathology
- Can reduce animal usage in preclinical experiments

**3-D CULTURE MODELS CAPTURE THE IN VIVO SITUATION:**
- Form functional airway epithelium
- Mucus secretion
- Cilia formation
- Form functional epidermis
- Stratified morphology
- Barrier function
- Form vascular tubules
- Von Willebrand factor & CD31 expression
- AcLDL uptake
- Form Organoids
- Microtissue structure
- Genotypically/phenotypically stable

**COMPLETE PRIMARY CELL SOLUTIONS FOR ROBUST CELL GROWTH**
- ATCC offers:
  - Primary cell media
  - Cell-specific growth kits
  - Dissociation reagents
  - Cryopreservation media
  - Optimized growth protocols
  - Primary Cell Culture Guide

**Use the new Human Primary Cell selection guide at**
[www.atcc.org/primarycellselection](http://www.atcc.org/primarycellselection)
Pros and cons of different cell models for tissue-relevant functional studies

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hTERT-IMMORTALIZED PRIMARY CELLS combine the best of both worlds:

ATCC human telomerase reverse transcriptase (hTERT)-immortalized primary cells combine the *in vivo* nature of primary cells with the growth potential of a continuous cell line.

**Pros:**
- Mimic in vivo Tissue Phenotype
- Genotypic Stability: Diploid, Diploid/Near diploid, Aneuploid
- Proliferative Capacity: Limited, Extended, Continuous
- Inter-experimental Consistency: Varies by donor, Good, Good
- Serum requirement for media: Serum-free or low serum, Serum-free in some lines, Serum required

**Cons:**
- Primary cells are restricted to a finite number of cell divisions
- Telomers are repeat sequences that cap chromosome ends
- This limit is due to the loss of telomeres during cell division
- Transfect target cells with the catalytic subunit of telomerase enzyme (hTERT)
- hTERT catalyzes the replacement of telomere subunits
- The hTERT-expressing cell escapes senescence

hTERT-IMMORTALIZATION:
- Replication resulting in telomere loss
- Senescence

Bypassing replicative senescence: Overexpression of telomerase and supportive oncoproteins in primary cells

5-fold increase in lifespan
Retention of physiological characteristics

hTERT-immortalized and normal Primary Cell Culture Guides

Learn all about:
- Growth media formulations
- Culturing conditions
- Seeding densities
- Cell counting
- Confluence
- Cryopreservation
- Subculturing protocols
- Download the guides at www.atcc.org/guides

Browse ATCC’s wide variety of hTERT-immortalized primary cells at www.atcc.org/hTERT