



# cell passages

Choosing a model system that faithfully represents the natural physiology of the cell when it is being studied *in vitro* is fundamental to understanding its function *in vivo*. ATCC offers a wide variety of primary cells that have been immortalized using the hTERT component of the Telomerase gene. These cell lines combine the physiology and stable karyotype of primary cell isolates and the indefinite propagation properties of continuous cell lines, while avoiding the replicative senescence of the former and the unstable karyotype of the latter.

This month, Cell Passages will feature the newest additions to the hTERT immortalized cell line collection, but make sure to check out all of the [hTERT-immortalized cell lines](#) available from ATCC. Also, be sure to download the [ATCC® hTERT-immortalized Cell Culture Guide](#) for tips and techniques for culturing hTERT-immortalized cell lines.

## TIME-GFP Cells—Now Available!

The telomerase-induced microvascular endothelial (TIME) cell line ([ATCC® No. CRL-4025™](#)) was generated by hTERT-immortalization of neonatal foreskin microvascular endothelial cells.

ATCC now offers TIME cells that have been modified to constitutively express GFP under the control of the CMV promoter ([ATCC® No. CRL-4045™](#)). Like their non-GFP counterparts, these cells exhibit a normal karyotype, long culture life, and endothelial characteristics that make them an ideal model for the study of angiogenesis and other aspects of endothelial biology.

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### ATCC Publications

[hTERT Cell Culture guide](#)

[Primary Cell Culture guide](#)

[Stem Cell Culture guide](#)

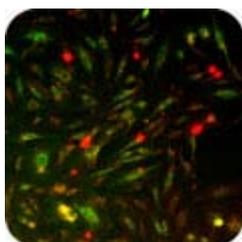
[Animal Cell Culture guide](#)

### FAQ

Q: How can you verify the success of cell immortalization with the hTERT plasmid?

A: Methods for assessing whether cells have been successfully immortalized with hTERT include: the Telomere Repeat Amplification Protocol (TRAP) assay, karyotyping, observation of morphology and growth between 25 to 50 PDLs (population doubling levels), and observation of relevant protein expression in early and late passage cells.

[Have more questions?](#)



hTERT-immortalized Keratinocytes—**Now Available!**



Literature Spotlight: hTERT-immortalized Renal Proximal



Webinar: hTERT-immortalized Cell Lines

Ker-CT ([ATCC® CRL-4048™](#)) cells are neonatal foreskin keratinocytes that have been immortalized through the forced expression of the hTERT and mouse CDK4. These cells are ideal for dermal-related research such as wound healing and tissue engineering, and for drug discovery applications.

### Tubular Epithelial Cells

A study published in the [American Journal of Physiology - Renal Physiology by Radford et al.](#), uses h-TERT-immortalized renal proximal tubular epithelial cells RPTEC/TERT1 ([ATCC® CRL-4031™](#)) to unravel how specific carcinogens act on normal renal cells. The authors tested how renal carcinogens disrupt primary cilia, which can lead to re-entry into the cell cycle and malignancy, by treating differentiated RPTEC/TERT1 cells with known carcinogens and looked for a reduction in the number of primary cilia. They then performed microarray analysis to look for similarities and differences in how individual carcinogens affected gene expression. They found the some renal carcinogens induce loss of the primary cilium, while others do not, and these results were mirrored by the microarray data. Additionally, they found that the effect on the primary cilium is independent of cell-cycle re-entry. This study illustrates how renal cancer may arise through multiple mechanisms and how RPTEC/TERT1 cells can help investigators understand how renal cancer develops and help them to devise strategies for its prevention and treatment.

[Learn more about the ATCC collection of hTERT lines >>](#)

(Radford, R. et al. Carcinogens induce loss of the primary cilium in human renal proximal tubular epithelial cells independently of effects on the cell cycle. *Am J Physiol Renal Physiol* 302, F905-16.)

### Unique Tools for Tissue-Relevant Research

Presenter: Chengkang Zhang, Ph. D.

ATCC hTERT-immortalized cell lines represent a breakthrough in cell biology research that combines the *in vivo* nature of primary cells and the *in vitro* utility of continuous cell lines. Normal primary cells are difficult to isolate, often vary from lot to lot, and senesce after a few passages. Traditional cell lines, on the other hand, are genetically unstable and present inconsistent phenotypes over time. In this webinar, we are going to use an hTERT-immortalized Renal Proximal Tubular Epithelial Cell line, RPTEC/TERT1 ([ATCC® No. CRL-4031™](#)) as an example to show how cell biologists can use the hTERT cell lines from ATCC as valuable tools for the studies of cell functions *in vitro*.

[Watch webinar on demand>>](#)

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