TPC-1 Human Papillary Thyroid Carcinoma Cell Line

Cancer Cell Line

Cat. # SCC147

Pack size: ≥1x10^6 viable cells/vial

FOR RESEARCH USE ONLY.
NOT FOR USE IN DIAGNOSTIC PROCEDURES.
NOT FOR HUMAN OR ANIMAL CONSUMPTION.

Store in liquid nitrogen

Data Sheet

Background

Thyroid cancer is the most prevalent endocrine carcinoma, with a rapidly increasing occurrence in many countries[1]. Human models of differentiated thyroid cancer are highly valuable for assessing the pathways and mechanisms that contribute to thyroid carcinogenesis. TPC-1 is a widely published and well-characterized cell line isolated from a papillary thyroid carcinoma of a female patient[6]. The genome of TPC-1 contains the *RET/PTC1* rearrangement found in approximately 20% of sporadic papillary carcinomas in adults[2]. TPC-1 harbors a silent polymorphism in *H-RAS*, and is wild-type for sequences of *BRAF*, *CNBB1*, *EGFR*, *K-RAS*, *RAF-1*, *PI3K*, and *TRHB*[3]. TPC-1 cells produce thyroglobulin (Tg) as well as expressing the thyroid differentiation marker *PAX8* and the tumor progression factor podoplanin[4]. In addition, TPC-1 has been utilized as an *in vitro* model for human cytomegalovirus latency, a potential contributor for certain human cancers[5]. The TPC-1 cell line is thus an excellent system for investigating mechanisms of thyroid carcinogenesis.

Short tandem repeat (STR) Profile

D3S1358: 16, 17	D16S539: 9
TH01: 9	CSF1PO: 11, 12
D21S11: 30, 31.2	Penta D: 9, 13
D18S51: 13, 16	vWA: 14, 18
Penta E: 18	D8S1179: 11, 17
D5S818: 8, 10	TPOX: 11
D13S317: 11, 12	FGA: 20, 21
D7S820: 11	Amelogenin: X

Cancer cell lines are inherently genetically unstable. Genetic instability may arise in the form of loss of heterozygosity of alleles at one or more genetic sites with increased passages.

Quality Control Testing

- Each vial contains ≥ $1X10^6$ viable cells.
- Cells are tested negative for infectious diseases by a Human Essential CLEAR panel by Charles River Animal Diagnostic Services.
- Cells are negative for mycoplasma contamination.
- Cells are verified to be of human origin and negative for inter-species contamination from mouse, rat, chinese hamster, Golden Syrian hamster, and non-human primate (NHP) as assessed by a Contamination CLEAR panel by Charles River Animal Diagnostic Services.
- Each lot of cells is genotyped by STR analysis to verify the unique identity of the cell line.

Storage and Handling

TPC-1 Human Papillary Thyroid Carcinoma Cell Line should be stored in liquid nitrogen. The cells can be cultured for at least 10 passages after initial thawing without significantly affecting the cell marker expression and functionality.

Representative Data

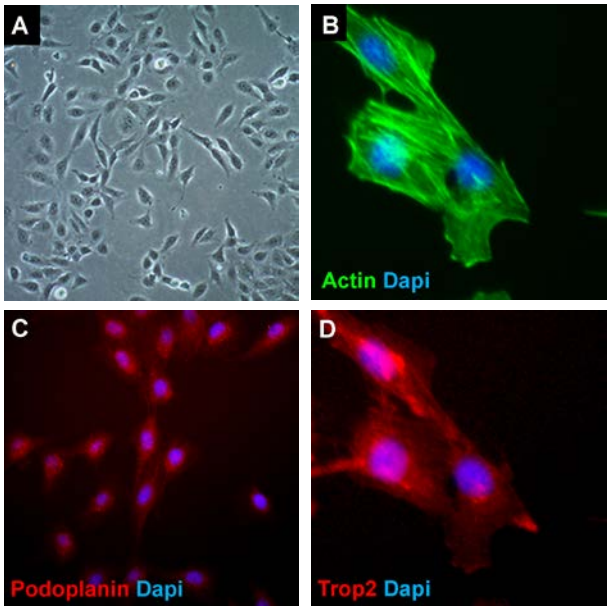

Figure 1.
TPC-1 cells one day after thaw in a T75 flask (**A**). TPC-1 expresses actin (**B**, Sigma P5282), podoplanin (**C**, Abcam AB10274) and Trop2 (**D**, MABC518).

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Protocols

Thawing Cells

1. Do not thaw the cells until the recommended medium is on hand. Cells can grow on normal tissue cultureware surfaces without any additional coating.

   TPC-1 Expansion Medium: Cells are thawed and expanded in RPMI-1640 (Sigma Cat. No. R0883) supplemented with 2 mM L-Glutamine (Cat. No. TMS-002-C) and 10% FBS (Cat. No. ES-009-B).
2. Remove the vial of frozen TPC-1 cells from liquid nitrogen and incubate in a 37°C water bath. Closely monitor until the cells are completely thawed. Maximum cell viability is dependent on the rapid and complete thawing of frozen cells.

   IMPORTANT: Do not vortex the cells.
3. As soon as the cells are completely thawed, disinfect the outside of the vial with 70% ethanol. Proceed immediately to the next step.
4. In a laminar flow hood, use a 1 or 2 mL pipette to transfer the cells to a sterile 15 mL conical tube. Be careful not to introduce any bubbles during the transfer process.
5. Using a 10 mL pipette, slowly add dropwise 9 mL of TPC-1 Expansion Medium (Step 1 above) to the 15 mL conical tube.

   IMPORTANT: Do not add the entire volume of media all at once to the cells. This may result in decreased cell viability due to osmotic shock.
6. Gently mix the cell suspension by slowly pipetting up and down twice. Be careful not to introduce any bubbles.

   IMPORTANT: Do not vortex the cells.
7. Centrifuge the tube at 300 x g for 2-3 minutes to pellet the cells.
8. Decant as much of the supernatant as possible. Steps 5-8 are necessary to remove residual cryopreservative (DMSO).
9. Resuspend the cells in 15 mL of TPC-1 Expansion Medium.
10. Transfer the cell mixture to a T75 tissue culture flask.
11. Incubate the cells at 37°C in a humidified incubator with 5% CO_2.

Subculturing Cells

1. Carefully remove the medium from the T75 tissue culture flask containing the confluent layer of TPC-1 cells.
2. Rinse the flask with 10 mL 1X PBS. Aspirate after the rinse.
3. Apply 5-7 mL of Accutase or trypsin-EDTA solution and incubate in a 37°C incubator for 3-5 minutes.
4. Inspect the flask and ensure the complete detachment of cells by gently tapping the side of the flask with the palm of your hand.
5. Add 5-7 mL of TPC-1 Expansion Medium to the plate.
6. Gently rotate the flask to mix the cell suspension. Transfer the dissociated cells to a 15 mL conical tube.
7. Centrifuge the tube at 300 x g for 3-5 minutes to pellet the cells.
8. Discard the supernatant, then loosen the cell pellet by tapping the tip of the tube with a finger.
9. Apply 2-5 mL of TPC-1 Expansion Medium to the conical tube and resuspend the cells thoroughly.

   IMPORTANT: Do not vortex the cells.
10. Count the number of cells using a hemocytometer.
11. Plate the cells to the desired density. Typical split ratio is 1:6.

Cryopreservation of Cells

TPC-1 human papillary thyroid carcinoma cell line may be frozen in the expansion medium plus 10% DMSO using a Nalgene slow freeze Mr. Frosty container.

References

1. Davies L, Welch HG (2006). Increasing incidence of thyroid cancer in the United States, 1973-2002. *JAMA* 295(18): 2164-2167.
2. Pilli T, Prasad KV, Jayarama S, Pacini F, Prabhakar BS (2009). Potential utility and limitations of thyroid cancer cell lines as models for studying thyroid cancer. *Thyroid* 19(12): 1333-1342.
3. Meireles AM, Preto A, Rocha AS, Rebocho AP, Máximo V, Pereira-Castro I, Moreira S, Feijão T, Botelho T, Marques R, Trovisco V, Cirnes L, Alves C, Velho S, Soares P, Sobrinho-Simões M (2007). Molecular and genotypic characterization of human thyroid follicular cell carcinoma-derived cell lines. *Thyroid* 17(8): 707-715.
4. Rudzińska M, Gawel D, Sikorska J, Karpińska KM, Kiedrowski M, Stępień T, Marchlewska M, Czarnocka B (2014). The role of podoplanin in the biology of differentiated thyroid cancers. *PLoS One* 9(5): e96541.
5. Tanaka J, Ogura T, Sato H, Hatano M (1987). Establishment and biological characterization of an in vitro human cytomegalovirus latency model. *Virology* 161(1): 62-72.
6. Ishizaka Y, Itoh F, Tahira T, Ikeda I, Ogura T, Sugimura T, Nagao M (1989). Presence of aberrant transcripts of ret proto-oncogene in a human papillary thyroid carcinoma cell line. *Jpn J Cancer Res* 80(12): 1149-1152.

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