

BHD TUMOR CELL LINE AND UOK257-2 WILD TYPE FLCN-RESTORED RENAL CELL LINE

REFERENCE NUMBER

E-131-2010

PRODUCT TYPE

- Research Materials
- Therapeutics

KEYWORDS

- Tumor Cell Line
- Renal Cell Line
- renal cell carcinoma
- RCC

COLLABORATION OPPORTUNITY

This invention is available for licensing.

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DESCRIPTION OF TECHNOLOGY

Center for Cancer Research, Urologic Oncology Branch is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize kidney cancer tumor cell lines.

Scientists at the National Cancer Institute have developed a novel renal cell carcinoma (RCC) cell line designated UOK257, which was derived from the surgical kidney tissue of a patient with hereditary Birt-Hogg-Dube (BHD) syndrome and companion cell line UOK257-2 in which FLCN expression has been restored by lentivirus infection. These cell lines harbor a germline mutation of FLCN gene (alias BHD) and displays loss of heterozygosity, can grow as xenograft in nude mice. Patients affected with BHD develop skin papules (fibrofolliculomas), lung cysts, spontaneous pneumothorax and an increased risk for bilateral multifocal renal tumors. Loss of both copies of the FLCN gene has been documented in BHD renal tumors; however, the molecular mechanisms by which inactivation of the encoded protein, folliculin, leads to the BHD phenotype are currently unknown. They have developed an important research tool for in vitro folliculin functional studies. The companion cell line will be extremely useful for

comparative biochemical analyses of cell culture systems in which the FLCN gene is either expressed or inactivated, including identification of renal tumor biomarkers, alteration of biochemical pathways resulting from loss of FLCN function, tumorigenicity of FLCN null versus FLCN restored cells, preclinical therapeutic drug testing in xenograft animal models produced from injection of these cell lines, etc. UOK 257 and UOK257-2 are thus useful cell models for studying the underlying molecular derangements associated with mTOR pathways and other biogenesis pathways in human kidney cancer and for evaluating novel therapeutic approaches for this disease. UOK257 is also one of the 40-member renal cancer cell lines in the Tumor Cell Line Repository of the Urologic Oncology Branch (UOB), National Cancer Institute (NCI).

Topics of possible collaboration:

- For laboratory interests on the basis of metazoan tumor cell survival, including growth factor-regulated nutrient uptake; glucose or glutamine metabolism and epigenetic gene control; tumor cell bioenergetics and cell growth through AMPK and mTOR signaling pathways.
- In vitro and in vivo cell model for BHD cancer syndrome. It is a valuable research tool for laboratory interested in identification of new BHD tumor antigens for immunotherapy.
- These paired cell lines for FLCN gene expression and function studies, including gene therapy, cytogenetics, gene mutation research, and examination abnormalities of interaction with other proteins that may contribute to BHD.
- The excellent in Vivo model for preclinical xenograft imaging, including stable transfection. Cells could be labeled with reagents for PET, Luciferase, Fluorescent, for transgenic mice, optical molecular imaging, etc. and provides useful platform for preclinical drug evaluations.

POTENTIAL COMMERCIAL APPLICATIONS

- In vitro and in vivo cell model for BHD cancer syndrome. Research tool for investigating the underlying molecular mechanisms contributing to advanced BHD, including the identification of new BHD tumor antigens for immunotherapy
- Research tool for studying genes transcription status of genes involved in BHD to reveal the genetic processes occurring in BHD tissues that may contribute to advanced disease.
- Positive control cell line for FLCN gene expression and function studies, including cytogenetics, gene mutation research, and examination abnormalities of interaction with other proteins that may contribute to BHD.
- Research tools for testing the activity of potential anti-cancer drugs against BHD, a disease which has no effective treatment options; tool for searching tumor markers for diagnosis, prognosis and drug resistance.
- Therapeutic drug testing for targeting BHD renal tumors, possible starting material for developing a cancer vaccine against BHD.

COMPETITIVE ADVANTAGES

- Cell line is derived from a BHD patient
- Molecular and genetic features are well characterized

DEVELOPMENT STAGE

- Basic (Target Identification)

PUBLICATIONS

1. Yang Y, Padilla-Nash HM, Vira MA, Abu-Asab MS, Val D, Worrell R, Tsokos M, Merino MJ, Pavlovich CP, Ried T, Linehan WM, Vocke CD. (2008) The UOK 257 cell line: a novel model for studies of the human Birt-Hogg-Dube gene pathway. *Cancer Genet Cytogenet.* 180:100-9. [PubMed: 18206534]
2. Baba M, Hong SB, Sharma N, Warren MB, Nickerson ML, Iwamatsu A, Esposito D, Gillette WK, Hopkins RF 3rd, Hartley JL, Furihata M, Oishi S, Zhen W, Burke TR Jr, Linehan WM, Schmidt LS, Zbar B. (2006) Folliculin encoded by the BHD gene interacts with a binding protein, FNIP1, and AMPK, and is involved in AMPK and mTOR signaling. *Proc Natl Acad Sci USA.* 103:15552-7.

PATENT STATUS

- **Not Patented:** Research Tool. Patent protection is not being pursued for this technology.