TP53 point mutations are found in 50% of all cancers and seem to play an important role in cancer pathogenesis. Thus, human induced pluripotent stem cells (hiPSCs) overexpressing mutant TP53 are a valuable tool for the generation of in vitro models of cancer stem cells or for in vivo xenograft models.

Uhlmann et al. from the University Hospital of Düsseldorf, described a protocol for the alteration of gene expression in hiPSCs via overexpression of a mutant form of the TP53 (R249S) gene using lentiviral transduction. A high amount of TP53 protein is detected 1 week after transduction and antibiotic selection. Differentiation of transduced hiPSCs gives insight into a better understanding of cancer formation in different tissues and may be a useful tool for genetic or pharmacologic screening assays.

Basic Protocol 1: Production and concentration of third-generation lentivirus Support Protocol 1: Cloning of gene of interest into modulation vector Support Protocol 2: Preparation of DMEM GlutaMAX™ with 10% fetal bovine serum and 1% penicillin-streptomycin Basic Protocol 2: Transduction of human-induced pluripotent stem cells and selection of positively transfected cells Support Protocol 3: Preparation of Matrigel® -coated plates Support Protocol 4: Preparation of mTeSR™1 medium [1].

1)
Uhlmann C, Kuhn LM, Tigges J, Fritsche E, Kahlert UD. Efficient Modulation of TP53 Expression in Human Induced Pluripotent Stem Cells. Curr Protoc Stem Cell Biol. 2020 Mar;52(1):e102. doi: 10.1002/cpsc.102. PubMed PMID: 31883435.