

Cell line profile: U-2 OS (ECACC catalogue no. 92022711)

Cell Line History

U-2 OS is (Fig 1) one of the earliest described cancer derived cell lines. It was obtained from a moderately differentiated bone sarcoma of the tibia of a 15-year-old girl by Ponten and Saksela in 1964. The cell line was originally designated '2T' and is believed to be one of the first human cell lines derived from a mesenchymal tumour¹.

Key characteristics

The cell line U-2 OS is chromosomally aberrant with a polyploid karyotype. According to the literature the cell line secretes a platelet like derived growth factor (PDGF)-like protein², expresses insulin-like growth factor (IGF) receptors and respond to the addition of IGF-I and II with an increase in DNA synthesis³.

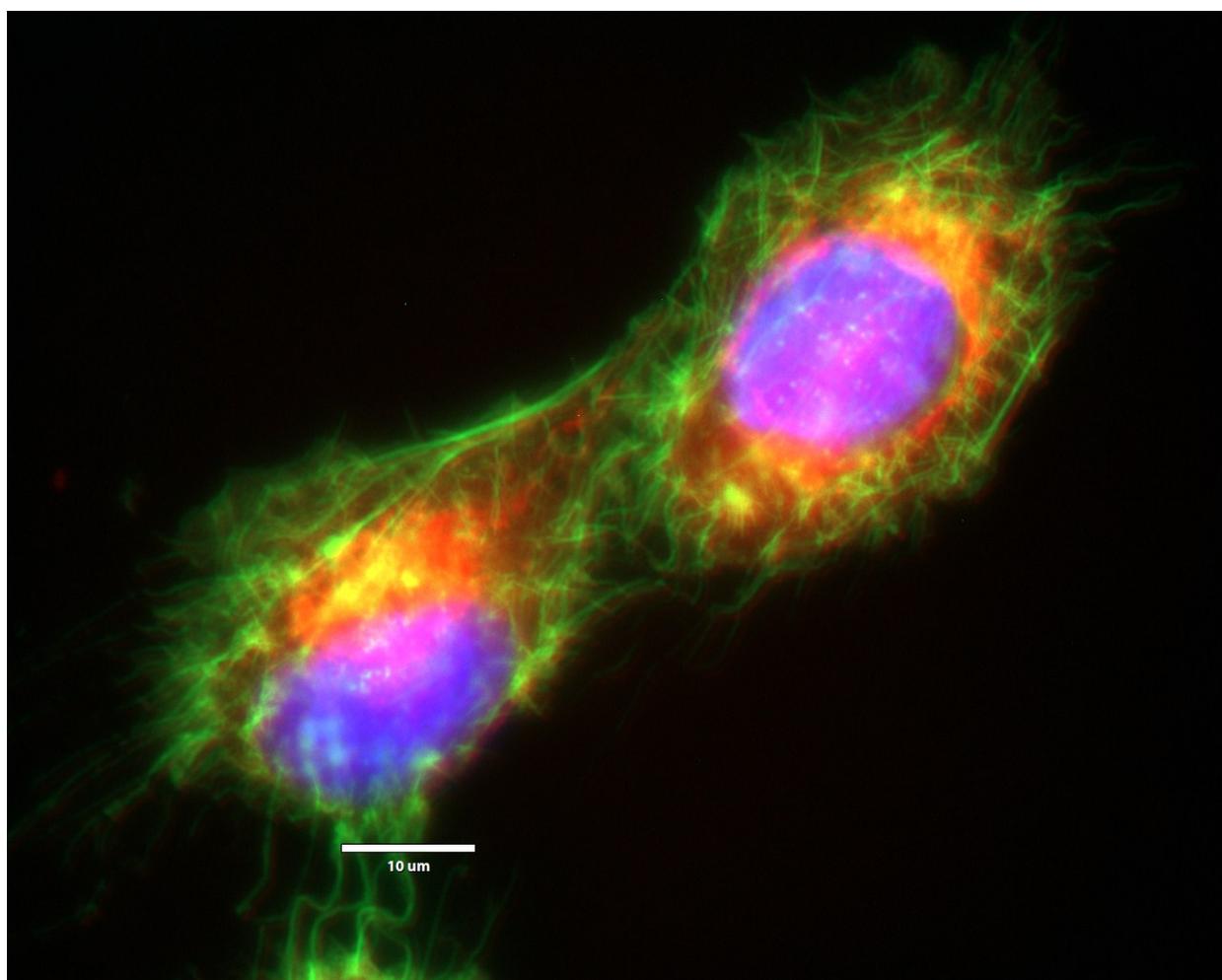


Figure 1: ECACC U-2 OS cells immediately following cell division showing actin cytoskeleton (phalloidin/Alexafluor488™ (green)), mitochondria (Mitotracker™ ROS (red)), and nuclei (NucBlue™ (blue) (all stains from Life Technologies)). Image captured by Gywain Jones using the EVOS-FL microscope with x100 objective under oil immersion.

STR Profile

Locus	Score
Amelogenin	X
CSF1P	13
D13S317	13
D16S539	11,12
D5S818	11
D7S820	11,12
THO1	6,9.3
TPOX	11,12
vWA	14,18

Applications

The use of U-2 OS is widespread in the literature with thousands of Pubmed citations in many different fields and historically it has had a key application in bone formation, bone tumour and arthritis research⁴.

In more recent years, the cell line has shown itself to be useful as a successful transfection host using many commercially available kits, this combined with absence of any detectable adenovirus infection makes the cell line a useful expression platform in virology. For example: providing a suitable and more sensitive alternative to Huh-7 cells for siRNA studies

on HCV RNA replication⁵ and in the study of the HPV11 genome⁶.

Although mesenchymal in origin, U-2 OS cells also have a flat, epithelial-like morphology making them a valuable tool in novel imaging technologies⁷. Examples of the U-2 OS cells' use in imaging include: the development of fluorescent imaging techniques to examine dynamic events in live cells⁸, in the technique of 'Cell Painting'^{9, 10}, to assess cell proliferation in live cell imaging¹¹ and in the detailed study of cell organelles such as mitochondria⁷ (Figure 2).

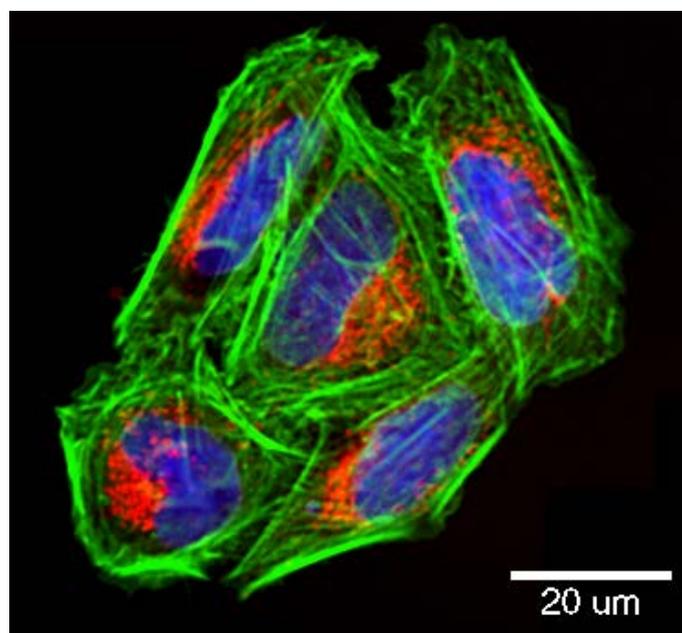


Figure 2: Confocal image of ECACC U-2 OS cells grown in multi-well plates showing individual mitochondria (Mitotracker™ ROS (red)), actin cytoskeleton (phalloidin/Alexafluor488™ (green)), and nuclei (NucBlue™ (blue)) (all stains from Life Technologies). Image captured using the ImageXpress Micro Confocal High-Content Imaging System (Molecular Devices).

Culture Tips

Cells should be grown in tissue culture treated flasks in McCoy's 5a medium supplemented with 1.5mM Glutamine and 10% foetal bovine serum (FBS). Cultures should be kept in a humidified 37°C / 5% CO₂ incubator and the medium renewed two to three times a week.

Cells should be sub-cultured while still sub-confluent using Trypsin/EDTA solution following two washes with PBS (Ca²⁺ and Mg²⁺ free). Allow the flask to sit at room temperature (or at 37°C) until all the cells detach. Add fresh medium, aspirate and dispense into new culture flasks.

Related Cell Lines

ECACC Catalogue Number	Cell Name	Line	Description
89050205	Saos-2		Human primary osteogenic sarcoma from an 11 year-old female
87070202	HOS		Human osteosarcoma derived from a 13 year-old female. Cells are sensitive to both virus and chemical transformation and exhibit a flat morphology, low saturation density and low plating efficiency in soft agar. From the same patient as 143B (ECACC Catalogue number 91112502).
91112502	143B		Human bone osteosarcoma. Cells are thymidine kinase deficient (TK-) and resistant to BUdR. From the same patient as HOS (ECACC Catalogue number 87070202).
86112810	KHOS-240S		A revertant line of the KHOS/NP cell line (ECACC catalogue no. 84102903). Established after overnight incubation at 40.5°C and then sub-cloned at 36°C. The line has similar properties to the parent Human Osteogenic Cell Line HOS. Cells are non-tumourigenic in nude mice and no longer possess a rescuable MSV genome
86112811	KHOS-312H		A revertant line of the Human Osteogenic KHOS/NP cell line. Established after overnight incubation at 40.5°C and then sub-cloned at 36°C. The line has similar properties to the parent HOS cell line. Cells are non-tumourigenic in nude mice and no longer possess a rescuable MSV genome
84102903	KHOS/NP		Isolated from transformed foci of human osteogenic sarcoma (HOS) cells which were induced by Kirsten murine sarcoma virus. They contain MSV genome but do not produce infectious virus. The transformed cells exhibit a high saturation density, a high plating efficiency in soft agar and produce tumours in nude mice.
86051601	MG-63		Human osteosarcoma from an osteosarcoma of a 14 year-old male. Produces high yields of interferon following superinduction with polyinosinic acid-polycytidilic acid, cyclohexamide and actinomycin. Antigenically, MG-63 interferon is more closely related to human fibroblast than to leukocyte interferon.

References

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