

CELL LINES FOR THE STUDY OF BONE FORMATION AND REGULATION

Brief Summary:

UMKC Researchers have developed novel cell lines that are useful in the examination of osteocyte function, biomineralization, SOST/sclerostin, FGF23 and other mechanisms of osteoblast-to-osteocyte differentiation.

Detailed Description:

The two cell lines were isolated from long bone of a mouse that was generated by crossing the Immortomouse® with a mouse where the DMP1 promoter drives expression of the GFP. One of the cell lines, IDG-SW3 (SW3), expresses all of the markers of osteocytes including Dmp1-GFP, Dmp1, E11/gp38, SOST/sclerostin, and FGF23. The second cell line, IDG-T1 (T1), mainly expresses the characteristics of the matrix producing osteoblast such as high alkaline phosphatase, with delayed expression of Dmp1-GFP and E11/gp38, but no expression of SOST/sclerostin or FGF23. Both cells will produce new bone *in vivo*.

Uses:

- To generate large numbers of osteocyte-like cells in order to produce sufficient quantities of osteocytes for study.
- To generate large numbers of cells of a homogeneous stage of osteogenic differentiation.
- To study osteocyte secretion of sclerostin, such as screening for sclerostin antagonists.
- To investigate regulation of FGF23 expression in osteocytes and the role of osteocytes in regulation blood calcium/phosphate homeostasis.
- To study the role of osteocytes as mechanosensory cells and their role in regulating bone response to mechanical stress.
- To screen potential new therapies to induce bone formation.
- To track cells responsible for bone formation *in vivo*.
- To identify additional osteocyte-selective markers and receptors.

Advantages:

This invention is an improvement over previous cell lines due to the following factors:

1. The cells are maintained in a non-differentiated state at 33°C in the presence of interferon- γ (IFN- γ), which allows large scale production without the loss of phenotype as occurs with other cell lines;
2. Upon culture at 37°C in the absence of IFN- γ , the temperature-sensitive large T-antigen is no longer expressed, no longer functional, and no longer contributes to the cell phenotype. Thus, the cells have the same gene expression as primary cells;
3. The cells are clonal, so all cells are homogeneous and at the same stage of differentiation;
4. The IDG-SW3 cells express the series of markers of the early-to-late osteocyte including Dmp1-GFP, E11/gp38, SOST/sclerostin, and FGF23;
5. These cells can be maintained not only in 2D cultures but also in 3D cultures;
6. These cells are viable up to 35-50 days; and
7. These cells will generate new bone *in vivo*.

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Please visit our website at: <http://www.umkc.edu/ors/ott> for a detailed description of this and other technologies.

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