Shortage and lack of *in vitro* control and disease models of different cell types have hindered the progress in understanding and treating many diseases. Human induced Pluripotent Stem Cells (hIPSCs) are an attractive source of cells when primary cells are limited or inaccessible. They have been established as an accepted platform for drug, siRNA and toxicology screening during drug discovery and development. However, traditional methods of directed differentiation of hIPSCs are cumbersome, lengthy, and difficult to reproduce between labs.

Elpis Biomed have developed a robust and inducible hIPSCs forward programming platform by targeting all components of the Tet-ON system necessary for inducible expression of transcription factors into genomic safe harbour site (GSHs). The Tet-ON system consists of two components, 1) a constitutively expressed transcriptional activator protein responsive to doxycycline (dox) (reverse tetracycline transactivator [rtTA]), and 2) an inducible promoter regulated by rtTA (Tet-responsive element) that drives expression of the transgene. Each element was introduced into a different GSH site to enable tight control of transgene expression while allowing for increased design flexibility with the larger cargo capacity per site. Furthermore, this design reduces gene-silencing of the transgene and accordingly makes it possible for cells to be passaged extensively without changes to the differentiation potential of the cells.

Based on the optimised dual-safe harbour technology, Elpis has produced homogenous, controllable, and extremely high expression of inducible transgenes NGN2 and MyoD in hIPSCs. These cells, on addition of doxycycline, differentiate within days into pure, mature and functional cortical neurons and skeletal muscle cells, respectively.

Elpis' cells are ready-to-culture mature, differentiated human cells for research use. The cells are suitable as models for research in cell-type specific biology, target validation and drug screening in pharmaceutical R&D, and screening for toxicology. Our cells are pure (>99%), easy to culture and ready for use without requiring cumbersome cell culture work. Batch-to-batch consistency has ensured that cells have been successfully used in very demanding screening conditions where only small changes had to be picked up from background noise.

Our strong proprietary technology allows for the production of mature human cell types with unprecedented efficiencies.