



## **Toshihiko Ezashi, PhD – Senior Scientist**

Toshihiko (Toshi) Ezashi D.V.M., Ph.D. has published 70 journal papers and 7 book chapters thus far, and 5,126 research papers have cited his works (as of July 2021). His research includes studying human embryonic stem cells (hESC) and induced pluripotent stem cells (iPSC) to understand how the trophoectoderm lineage is specified during early embryonic development. Using the model, he re-creates trophoblasts from infants born to mothers with early onset pre-eclampsia (EOPE) by generating 29 iPSC lines from discarded umbilical cord and converting these pluripotent cells to the specified trophoblasts. The properties of these cells were compared with those generated from cord cells derived from pregnancies not complicated by pre-eclampsia. Upon differentiation to early trophoblast, EOPE iPSC display consistently reduced invasion under stressful, high O<sub>2</sub> (20%) conditions than control iPSC, whereas under low O<sub>2</sub> (4-5%) conditions the invasive potentials of the control and EOPE- derived cells are indistinguishable. These models should help to define the pathogenesis of these and related diseases and help direct the development of novel diagnostic and treatment strategies.

Dr. Ezashi pioneered culturing hESC under physiologic oxygen levels (2-5% O<sub>2</sub>) to prevent spontaneous differentiation and increased the

formation of embryoid bodies, which signify the greater ability of the hESC to develop into many different cell types within the body than hESC cultured in atmospheric oxygen (20 %). This finding has significantly enhanced our ability to work with and maintain hESC in an undifferentiated state in culture. This discovery has made a major impact in the stem cell, cancer cell, oxidative stress fields, and has been cited by more than 1,077 research papers.

Dr. Ezashi's research also includes establishment of pluripotent stem cells from farm animals, especially pigs, by using primed- and naïve-type conditions. His nine papers in this field have been cited by more than 1,067 research papers.

Dr. Ezashi joined CCRM in June of 2021 to establish strong stem cell research programs to study mechanisms of human implantation. He is interested in extending new stem cell applications to study human trophoblast functions in early pregnancy. Dr. Ezashi also serves as an adjunct faculty at the University of Missouri where he spent 26 years before moving to CCRM.