Microscopic cells race to victory in first World Cell Race at ASCB meeting

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A "team" of fast-moving, bone marrow stem cells from a research laboratory in Singapore has run away with the first World Cell Race, finishing first with a cellular speed record of 5.2 microns per minute (or 0.000204 inches per minute) in results announced today at the 51st Annual Meeting of the American Society for Cell Biology (ASCB).

The mesenchymal bone marrow stem cells grown at the National University of Singapore by Yuchun Liu, PhD, were one of 70 cell lines entered by labs from all over the world and raced on specially designed micro-tracks, a few microns wide and 400 microns long. The micro-tracks, donated by CYTOO Cell Architects of Grenoble, France, were coated with fibronectin, a natural substrate on which the cells could get traction. The racing cell lines were frozen for shipment to one of six labs around the globe where they were thawed, stained with fluorescent dyes, and raced against the clock. The action was video recorded for 24 hours and the times were sorted by custom software created at the Institut Curie in Paris, according to Manuel Théry, PhD, who along with Ana-Maria Lennon-Duménil, PhD, and Matthieu Piel, PhD, organized the World Cell Race. Piel and Lennon-Duménil are at the Institut Curie. Théry is with the Institut de Recherche en Technologies et Sciences pour le Vivant (iRTSV) in Grenoble, France. The institute is part of the Commissariat à l'Energie Atomique (CEA).

"We measured the position and speeds of all individual cells in each group," says Théry. "For each cell line, we then determined the fastest run over 400 microns."

Théry says the idea for a cell race came to them at last year's ASCB Annual Meeting in Philadelphia where the three French scientists were struck by the large number of papers and the lively discussions about cell migration. How cells move is one of the hottest fields in research today because of the implications in cancer where motility—the ability of tumor cells to move autonomously--is critical to understanding how cancer metastasizes. Cell movement is also vital to normal biology including embryonic development and human growth. Théry says that the World Cell Race was a way to mix the fun of a scientific sporting event with serious research into how speed reflects the nature of certain cells.

Finishing second and third place were cell lines provided by Odile Filhol-Cochet, PhD, of iRTSV/CEA in France. The second place winners were "wild type" normal mammary breast epithelial cells, clocked along the 400 micron track at 3.2 microns per minute. Third place award went to a cell culture of these mammary epithelial cells altered in the lab with a knocked-down casein kinase 2 and an overactive Ras pathway. The re-engineered cells roared down the track at 2.7 microns per minute.

In fourth place were human keratinocytes cultured from samples taken from patients suffering from Kindler syndrome, a rare genetic skin disorder, entered by Rumena Begum of King's College London, UK. Their speed over 400 microns was 2.5 microns per minute.

The winners will receive a Nikon camera and a World Cell Race medal.

In addition to being enjoyable, the first World Cell Race generated valuable data. "Data analysis revealed an unknown feature of cell migration," says Théry. "Fast cells were persistent they rarely changed the direction of their migration. Slow cells were not persistent. They went back and forth." Correlating the speed of cells to their invasive behavior in cancer, for example, could uncover new approaches to

treatment, Théry believes.

If the First World Cell Race is a success at ASCB, Théry hopes for a second running next year. "Maybe with additional games," he suggests. "Swimming and weightlifting."

More information: www.ascb.org/meetings/subgroup/subgroup.cfm#i

Provided by American Society for Cell Biology