

Cells Misbehaving

Abnormal divisions provide clues to cancer

*Assistant Professor of Biological Sciences
Mi Hye Song, Ph.D., with senior Biological
Sciences student Lauren DeMeyer.*

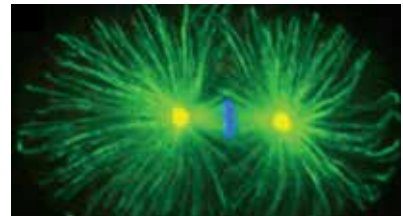
The research of Mi Hye Song, Ph.D., starts at the very beginning with cell division. Dr. Song and her group are interested in understanding how cells divide without errors, which ultimately contributes to finding treatment options for cancer and other human diseases.

“We’re actually looking at early embryos of the nematode, *Caenorhabditis elegans* (*C. elegans*),” explained Dr. Song, an assistant professor of Biological Sciences. “We’re looking at a very early event, from fertilization to the first and second cell divisions.” The genome of a genetically manipulative nematode, *C. elegans* shares strong similarities to that of humans.

Since 2001, Dr. Song has studied centrosomes, tiny organelles that are the primary microtubule-organizing centers in animal cells, which are essential for maintaining the fidelity of cell division. Using genetics and high resolution time-lapse microscopy, Dr. Song captures detailed steps of cell cycle progression in *C. elegans* embryos by mutating one gene at a time.

These observations will help determine which genes are responsible for proper cell divisions, and help pinpoint where, when or what goes awry during cell cycle progression. “Then we may be able to find out how to prevent these detrimental events from happening,” Dr. Song said.

*The *C. elegans* embryo illustrates cell division with micro-tubules shown in green, DNA in blue and centrosomes in yellow.*



Ultimately, Dr. Song hopes to contribute to advancing cures for human diseases. Recently, her group found that RNA-binding proteins play a critical role in centrosome assembly. One of the proteins is found to be associated with human neurodegenerative diseases such as ataxia. Her research team currently focuses on identifying RNA molecules and characterizing their role in centrosome assembly, which will help understand the link between RNA-binding role in centrosomes and human pathology.

It all goes back to basic biology that provides fundamental mechanisms by which normal cellular processes occur — in order to attack human disorders, Dr. Song said.

“If you want to know how to stop abnormal cell divisions, we should understand how cells normally divide, first.” 🐉

By Cara Catallo, a freelance writer from Clarkston, Michigan.