BYU breakthrough targets birth defects

BYU biochemistry professor Emily Bates has made recent discoveries that may revolutionize medicine

by Meredith Long Sep 12, 2012, 2:58 pm

BYU research has shed light on the cause and prevention of birth defects as well as cancer.
BYU biochemistry professor Emily Bates and a few of her students recently performed and published research that may lead to a permanent answer for birth defects and impact how cancer is treated.

Fetal Alcohol Syndrome and a rare condition called Andersen-Tawil Syndrome both cause birth defects like cleft palates, small or missing teeth and misshaped or connected fingers and toes. Andersen-Tawil Syndrome is caused by genetic changes in a potassium channel, which is also the same channel blocked by consumption of alcohol.

Bates and her students made the revolutionary discovery that potassium channels help cells receive instructions that tell them what they are and where they should be.

Dr. Bates in the research lab

The study suggests that blocking this channel blocks some instructions for patterning and an organism from coming through. If the channel is blocked during pregnancy, like in Andersen-Tawil Syndrome or Fetal Alcohol Syndrome, the cells do not receive instructions and birth defects can occur.

The instructions for cells to divide and move need to be sent during pregnancy while a baby is developing, but those signals should turn off after the baby is born so the cells stay where they are. In cancer cells, the signal has turned back on, allowing cells to metastasize or invade other tissues and allow for growth of new tumors.

Not only are Bates and her students excited to have found some information about the causes of Andersen-Tawil and Fetal Alcohol Syndrome, they are also excited to test a possible therapy to stop the spread of cancer cells throughout the body.

“What happens later on in life if someone gets cancer, is that this pathway turns on when it’s not supposed to turn on anymore,” Bates said. “The cancer cells start to metastasize, or invade another tissue causing more tumors. What we hope is that blocking this channel will block a signalling pathway that drives metastasis.”
In other words, if Bates and her students can eventually find a way to block the channel after it opens back up, cancer cells will not spread throughout the body once the original tumor is removed.

Participation in this research helped student Brandon Gassaway earn a $90,000 grant from the National Science Foundation to fund studies at Yale. Current BYU graduate student, Giri Dahal, has also received funding for his research.

“This work is really great, it’s meant everything to me,” Dahal said. “This is the best thing that can happen and my work is going well.”

Bates is happy her students are well prepared at the graduate and undergraduate level for their futures.
“What’s great about this research is that it’s so fun,” Bates said. “It is exciting to work on something that could, perhaps, impact medicine, both prenatal development and cancer. The more students get an opportunity to contribute to research projects, the better off they’re going to be getting into schools and jobs.”