# Study: Blocked ionic channels prevent cellular development, cause birth defects

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(Medical Xpress)—The cellular cause of birth defects like cleft palates, missing teeth and problems with fingers and toes has been a tricky puzzle for scientists.

Now Professor Emily Bates and her biochemistry students at Brigham

Young University have placed an important piece of the developmental puzzle. They studied an ion channel that regulates the electrical charge of a cell. In a new study published by the journal *Development*, they show that blocking this channel disrupts the work of a protein that is supposed to carry marching orders to the nucleus.

Without those instructions, cells don't become what they were supposed to become – be that part of a palate, a tooth or a finger. Though there are various disorders that lead to birth defects, this newly discovered mechanism may be what some syndromes have in common.

Bates and her graduate student, Giri Dahal, now want to apply the findings toward the prevention of birth defects – particularly those caused by fetal alcohol syndrome and fetal alcohol spectrum disorder.

"What we think might be the case is that this is the target for a few similar disorders," Bates said. "The big thing that we have right now is that this ion channel is required for protein signaling, which means that developmental signaling pathways can sense the charge of a cell. And that's exciting for a lot of different reasons."

For example, the new study might also have implications for the battle against cancer. With cancer, the problem is that cells are receiving a bad set of instructions that tells them to multiply and spread. If they can devise a way to block the ion channel, it may stop those cancerous instructions from getting through.

"This protein signaling pathway is the same one that tells cancer cells to metastasize," Bates said. "We're planning to test a therapy to specifically block this channel in just the cells that we want to stop."

**More information:** An inwardly rectifying K+ channel is required for patterning, doi: 10.1242/dev.078592