Cystic Fibrosis Research News

Title:
Entry of Cystic Fibrosis Transmembrane Conductance Potentiator Ivacaftor into the Developing Brain and Lung

Lay Title:
How does the cystic fibrosis drug ivacaftor move in the body during pregnancy and breastfeeding?

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What was your research question?
Is ivacaftor transferred from mother to baby during pregnancy and breastfeeding, and if so does it target the lungs specifically or does it also accumulate in other organs?

Why is this important?
The novel cystic fibrosis drugs enable more women with cystic fibrosis to reach childbearing age. For many women discontinuing treatment during pregnancy or breastfeeding may result in a serious decline in lung function, affecting their own and their baby's health. The decision to continue treatment is currently based on informed consent. Knowing if and how these drugs are being transferred from mother to child helps to understand the risk-benefit and will help patients to make informed decisions.

What did you do?
We developed an animal model to investigate the extent to which maternally administered ivacaftor crosses the placenta during pregnancy and is transferred via breast milk in postnatal period. We tested how much of the transferred drug then enters different organs at different stages of baby development.

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What did you find?

In our model, we found that at all ages, ivacaftor preferential enters the lung (cystic fibrosis target tissue) when given acutely or chronically. Transfer of ivacaftor occurred across both the placenta and breast tissue and both transfer rates were about ~40%.

What does this mean and reasons for caution?

In our model, baby rats were exposed to maternally administered ivacaftor via placental and milk transfer. Furthermore, preferential entry in the lungs suggests the possibility that exposing CF babies to maternally administered ivacaftor could be beneficial for limiting progression of CF pathology in early development. These findings are based on an animal model and need further validation in clinical trials.

What's next?

We will investigate the safety and effectiveness of the novel triple combination Trikafta in cystic fibrosis during pregnancy using an F508del-cystic fibrosis rat model.

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