In Utero Prevention Of Congenital Heart Disease By Metabolic Intervention

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Technology description

UCLA researchers in the Department of Molecular Cell and Developmental Biology have discovered a method of preventing congenital heart disease through in utero treatment.

BACKGROUND

Congenital heart disease (CHD) is a heterogeneous group of structural anomalies in the heart that is present in 0.8% of newborn infants worldwide. Although the advance in pre-natal diagnosis allows us to detect CHD and assess the risk early during pregnancy, corrective surgery is currently the only effective option and there is no way to prevent the progression of CHD. Therefore, the financial, emotional and social burden of the families with a baby with CHD is huge. While the cause of CHD may vary, maternal hyperglycemia is associated with a 5-fold increase in CHD risk. Careful monitoring and control of the mother’ s blood glucose level has not been proven to be effective in preventing CHD. With rapidly increasing prevalence of diabetic pregnancy and high incidence of CHD, how to treat CHD will be an urgent issue in medical practice and medical economy in the next few decades.

INNOVATION

Professor Nakano and coworkers have discovered anin uterotreatment to prevent CHD. A chemical screen revealed that high maternal glucose levels interfered with development of heart muscle cellsviaa key regulatory pathway. By inhibiting this pathway using the FDA-approved small molecule, CHD could be prevented in mouse models. This chemical has been shown to cross the placental barrier and is non-toxic and efficacious at the dose used in this method.

RELATED MATERIALS

Nakano, H.; Minami, I.; Braas, D.; Pappoe, H.; Wu, X.; Sagadevan, A.; Vergnes, L.; Fu, K.; Morselli, M.; Dunham, C.; Ding, X.; Stieg, A. Z.; Gimzewski, J. K.; Pellegrini, M.; Clark, P. M.; Reue, K.; Lusis, A. J.; Ribalet, B.; Kurdistani, S. K.; Christofk, H.; Nakatsuji, N.; Nakano, A. Glucose inhibits cardiac muscle maturation through nucleotide biosynthesis.eLife. 2017.

Application area

Prevention of congenital heart disease

Advantages

This chemical is already FDA-approved for alternate indications
No current strategies to decrease risk of congenital heart disease
More effective than controlling maternal blood glucose levels

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