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Prenatal Glucocorticoid Administration and Fetal Lung Maturation: Can we learn more?

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Abstract

The most dangerous syndrome facing premature infants is Respiratory Distress Syndrome (RDS) which arises if the newborn's lungs are immature. The major cause of RDS is surfactant deficiency. The risk for a premature baby to have an RDS episode increases with morbidity and sex, boys being at higher risk. The disadvantage is link to the presence of androgens in lung and, male fetuses are exposed to higher androgen levels compared to female. For women at risk to deliver prematurely, glucocorticoids are used because of their ability to accelerate lung maturity but, for obscure reasons many fetuses do not respond to glucocorticoids even with optimal regimen. Although glucocorticoids are beneficial and unquestioned, questions such as when during pregnancy is the best time to administrate glucocorticoids, need further clarification. Surfactant is produced by PTII. This process is delayed by androgens and accelerated by glucocorticoids. Here, we showed that androgen synthesis occurs in the fetal alveolar epithelium with a delay between male and female. Second, two days before the surge of surfactant, the fetal lung, likes the adrenals, synthesizes glucocorticoids from cholesterol. This synthesis occurs with a sexual-specific delay between male and female fetuses. This gender effect could explain why many fetuses don't respond to glucocorticoids. Finally, when glucocorticoid synthesis is blocked with a CYP11B1 inhibitor, no glucocorticoid is produced and the translocation of glucocorticoid receptor to the nucleus is inhibited, suggesting that glucocorticoid-mediating effect in lung is also inhibited. Together our results suggest cross-talk between androgens and glucocorticoids in the optimal response of the fetal lung to glucocorticoids and in the physiopathology of RDS.

Biography

Yves Tremblay is a full professor at Laval University and in the Department of Obstetrics/Gynecology. He obtained his bachelor's in 1980, and his PhD in 1984. From 1985 to 1990, he pursued his post-doctoral training at the Louis Pasteur University in Strasbourg, then at the UCSF. In 1990, Dr Tremblay became professor at Laval University. He is recognized by the FRQS as a career research professor. He is also a member of Université Laval's Centre de recherche en biologie de la reproduction. He is the director of the Québec's Respiratory Health Network. He is also a member of the Board of Directors of the Quebec Lung Association.

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