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Titel des Beitrags: Ultrastructure of human placental tissue after 6 h of normoxic and hypoxic dual in vitro placental perfusion.

Abstract: The dual in vitro perfusion model of human placental tissue allows the study of different aspects of placental function, such as metabolism, transport and secretion of proteohormones, cytokines and prostaglandins. The integrity of the perfused placental tissue is an important parameter to validate the perfusion system. Using light and electron microscopy, the morphology of villous tissue was examined before and after six hours of normoxic (n=10) vs. hypoxic (n=10) perfusion. An apical shift of the rough endoplasmic reticulum and occasional vacuoles were found in the syncytiotrophoblast of the terminal villi, the exchange area of the placenta. No unexpected pathological findings were seen before the perfusion experiments and only slight changes with moderate distension of the endoplasmic reticulum after 6 h of normoxic perfusion. After hypoxic perfusions, distinct ultrastructural alterations, such as oedematous villous stroma, swollen or completely destroyed cell organelles (e.g., mitochondria and endoplasmic reticulum), multiple vacuoles inside syncytio- and cytotrophoblasts as well as the microvilli were seen, which leads to an impairment of the placental barrier and other functions. The ultrastructural examination of placental tissue before and after dual in vitro perfusion broadens the knowledge of physiological and pathophysiological
processes in the perfused placenta and may be a beneficial part of regular validation.