氏　　名	ALBUAYJAN HAYA HAMED H
授与した学位	博　　士
専攻分野の名称	医　　学
学位授与番号	博　甲第　7340　号
学位授与の日付	2025 年 9 月 25 日
学位授与の要件	医歯薬学総合研究科 病態制御科学専攻 （学位規則第 4 条第 1 項該当）
学位論文題目	Role of galectin-9 in the development of gestational diabetes mellitus (ガレクチン-９の妊娠糖尿病における役割)
論文審査委員	教授 大塚文男　　教授 塚原宏一　　准教授 中村圭一郎

学位論文内容の要旨

Galectin-9 (Gal-9) plays a vital role in placental function, including the differentiation of tissue resident natural killer (trNK) cells and contributing to inflammation in preeclampsia. However, the role of Gal-9 in gestational diabetes (GDM) remains unexplored. This study revealed that plasma Gal-9 levels are higher in the third trimester of GDM pregnancies, and these levels correlate with increased placenta and newborn weight. To understand Gal-9's direct impact, we used Lgals9 knockout pregnant mice on a high-fat diet, which developed maternal glucose intolerance and fetal macrosomia. Their placentas showed, increased proliferating cells, decreased apoptosis and impaired autophagy in the junctional zones. Furthermore, HFD KO mice, placental trNK cell numbers increased, specifically the Tim-3+ trNK population, which also had reduced early apoptosis. This suggests that high plasma Gal-9 could serve as a predictive biomarker for GDM complications like maternal glucose intolerance and fetal macrosomia. It also proposes that Gal-9 functions as a compensatory factor in GDM, potentially by promoting apoptosis in Tim-3+ trNK cells.

論文審査結果の要旨

The researcher studied the significance and the role of Galectin-9 (Gal-9) in gestatinal diabetes (GDM). Gal-9 plays a vital role in placental function, including the differentiation of tissue resident natural killer (trNK) cells and contributing to inflammation in preeclampsia. However, the role of Gal-9 in GDM remains unexplored. The authors revealed that plasma Gal-9 levels are higher in the third trimester of GDM pregnancies, and these levels correlate with increased placenta and newborn weight. To understand Gal-9's direct impact, they used Lgals9 knockout pregnant mice on a high-fat diet, which developed maternal glucose intolerance and fetal macrosomia. Their placentas showed, increased proliferating cells, decreased apoptosis and impaired autophagy in the junctional zones. Furthermore, HFD KO mice, placental trNK cell numbers increased, specifically the Tim-3+ trNK population, which also had reduced early apoptosis. This suggests that high plasma Gal-9 could serve as a predictive biomarker for GDM complications like maternal glucose intolerance and fetal macrosomia. It also proposes that Gal-9 functions as a compensatory factor in GDM, potentially by promoting apoptosis in Tim-3+ trNK cells.

This study includes a wide-ranged experimental data on Gal-9, which is important for the future clinical application in the field of GDM. Therefore, the researcher is eligible to receive a PhD (Medicine) degree.