研究区分	教員特別研究推進　地域振興

研　究 テーマ	Claudin-15 knockout mice, a potential model of lipodystrophy				
研究組織	代　表　者	所属・職名	看護学部・助教	氏名	Hempstock　Wendy
	研究分担者	所属・職名		氏名	
		所属・職名		氏名	
		所属・職名		氏名	
	発　表　者	所属・職名	看護学部・助教	氏名	Hempstock　Wendy

講演題目

Evidence of altered energy metabolism in claudin-15 knockout mice

研究の目的、成果及び今後の展望

Claudin-15 is a tight junction protein found along the intestinal tract of mice. It has been found to be important for nutrient uptake and paracellular transport of Na^+ in studies conducted with Claudin-15 knockout (Cldn15 KO) mice. However, the effect of claudin-15 loss is not limited to the gastrointestinal tract as Cldn15 KO mice exhibit less visceral and subcutaneous body fat. However, the extent of the effect of claudin-15 on fat tissue and energy homeostasis has not been fully explored to date. To understand the effects of the deletion of claudin-15 on energy metabolism and storage, Cldn15 KO mice on a C57Bl6/JCl background were subjected to blood plasma analysis for liver enzymes and insulin, as well as measurements of blood glucose and blood ketones in fed and fasted states. In addition, the metabolic rate of Cldn15 KO mice was investigated by gas exchange measurement in metabolic cages. Analysis of serum revealed that Cldn15 KO mice have elevated liver enzymes, decreased blood glucose, and decreased blood insulin. To investigate blood glucose more closely, mice were tested by glucometer test strips and ketone test strips in fed and 24-hour fasted conditions. It was found that under fed conditions, Cldn15 KO mice (both male and female) had lower blood glucose compared to their wildtype counterparts. After fasting, the difference between males disappeared while Cldn15 KO females tended to have lower blood sugar compared to fasted wildtype females. When looking at blood ketones, differences were found only in female Cldn15 KO mice, which had higher blood ketone levels in both fed and fasted conditions. In the metabolic cages, only male mice were tested and no differences in metabolism of fats and carbohydrates was observed. Overall, decreased body fat, insulin, blood sugar, and increased liver enzymes suggests that energy metabolism is altered in Cldn15 KO mice, with females seeming to be more affected. More in depth studies are required with both males and females to understand energy metabolism and how the loss of Claudin-15 is implicated. In the future, detailed analysis of hormones involved in energy storage and metabolism, such as leptin, GLP-1, and glucagon, should be investigated. In addition, detailed body composition analysis, as well as comparison of fat cells should be performed. Finally, RNA-sequence analysis of fat tissue may give some hints as to what is altered in Cldn15 KO mice.