Regulation of nutritional environmental responses and disease predisposition by osteocalcin in utero

Tomoyo Kawakubo-Yasukochi[1], Akiko Mizokami[2], Masato Hirata[3]

[1]Dept. Immunol. Mol. Pharmacol., Fac. Pharm. Sci, Fukuoka Univ., [2]OBT Res. Ctr., Fac. Dent Sci., Kyushu Univ., [3]Fukuoka Dent. Coll., OM Res. Ctr.

The Developmental Origin of Health and Disease (DOHaD) hypothesis, advocating long-term effect of fetal origins on adult disease, suggests that adverse environmental exposure during fetal and neonatal development might increase the susceptibility for developing a wide range of lifestyle-related diseases in later life. Indeed, our previous study demonstrated that maternal high-fat and high-sucrose feeding during gestational period deteriorated offspring's glucose and lipid parameters and triggered obesity in mice.

We recently clarified that osteocalcin, one of bone matrix proteins with placental transportability, is a mediator between glycolipid metabolism and bone metabolism through multiple mechanisms improving glycolipid metabolism. In this study, we aimed to investigate whether maternal osteocalcin administration during gestational period may ameliorate the offspring's metabolic statusthrough the function of changing the nutritional response *in utero* in mice, from an epigenetic perspective, because the biological mechanism underlying the DOHaD hypothesis is supposed to be mainly related to alteration in epigenetically regulated gene expression.

As a result, we revealed that maternal osteocalcin intake could avoid the ameliorable effects of gestational overnutrition on pups by regulating epigenomic nutritional responses.