108 MOST Young Scholars Grant (Einstein Program): Potentials for Gut Microbiota Therapies in Alzheimer’s Disease

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Ageing is a world trend. Alzheimer’s disease (AD) is the most common degenerative brain disease. Burden of AD has far-reaching effects on families and society. Currently there is neither a cure nor a treatment that addresses the underlying cause of AD. Gut microbes are associated with human health, gut microbiota affect brain function through brain-gut axis.

We compared the gut microbiota of Aβ precursor protein (APP) knock-in transgenic APPNL-G-F/NL-G-F (KI) mice, a mouse model of Alzheimer’s disease, with their wild-type (WT) controls. Faecal samples were collected from 24-months-old mice and analyzed by next generation sequencing (NGS). The results indicated that gut microbiota composition were different between WT and KI groups. Family Lachnospiracea was increased in KI mice when compared with WT controls whereas family Muribaculaceae was decreased. We also found that genus Oscillibacter and Butyricicoccus were significantly higher in KI mice, genus Bacteroides and Parasutterella showed a tendency decreased in WT mice. Interestingly, Lactobacillus species were obviously reduced in KI mice when compared with WT mice. Thus, this probiotic is likely to be a key microorganism for AD development. In summary, the transgenic AD mouse model has a similar gut microbiota composition with metabolic related diseases such as obesity. It coincided with the theory that obesity may aggravate AD symptoms in previous studies.

Our goal is to clarify whether specific gut microbiota are key targets of AD therapy. We anticipate using specific probiotics to regulate gut microbiota and may act as a therapeutic target for AD treatment to accelerate the successful of AD therapeutics in the future.