

# Effect of Probiotic Lactobacilli and *Bifidobacterium* on Streptococcal Adherence

A. Haukioja<sup>1\*</sup>, V. Loimaranta<sup>2</sup>, J. Tenovuo<sup>3</sup>

<sup>1</sup>Postgraduate School of Oral Health Sciences, Institute of Dentistry, <sup>2</sup>Department of Medical Biochemistry and Molecular Biology and <sup>3</sup>Department of Cariology, Institute of Dentistry, University of Turku, Finland.



# 0702

## Objectives

Some probiotic bacteria have been reported to exert anticariogenic effects, but the mechanisms are unknown. Our aim was to investigate the influence of probiotic *Lactobacillus* and *Bifidobacterium* strains to dental pellicle composition and consequently on streptococcal adherence *in vitro*.

## Methods

Three probiotic *Lactobacillus* strains (*L. rhamnosus* GG, *L. casei* str. Shirota and *L. reuteri* SD2112) and one *Bifidobacterium* (*B. lactis* Bb12) were included in this study. *L. casei* ATCC 11578, originally isolated from saliva, was used as a control. The pellicles were formed on hydroxyapatite (HA) by first incubating clarified whole saliva, parotid saliva or buffer with the probiotic bacteria. The bacteria were then removed and supernatants were used to coat the HA. Control pellicles for the adherence assays were formed by coating HA first with saliva and then with the supernatant from a bacterial suspension in buffer. After pellicle formation metabolically labelled *S. mutans* MT8148 or *S. gordonii* DL1 were allowed to adhere on HA.

To analyse the composition of the pellicles proteins were released from HA with SDS and analysed with SDS-PAGE.

## Results

*S. mutans* and *S. gordonii* both adhered well on parotid saliva coated HA but only *S. gordonii* adhered on whole saliva coated HA. Treatment of parotid saliva with lactobacilli or *Bifidobacterium* decreased significantly the adherence of *S. mutans* while the adherence of *S. gordonii* remained unaffected (Fig. 1). The probiotic bacteria or *L. casei* ATCC 11578 did not have any effect on streptococcal adherence on whole saliva coated HA or on control pellicles.

Results from SDS-PAGE analysis indicate that there are differences in the protein composition of the pellicles. For example, all *Lactobacillus* and *Bifidobacterium* strains remove a high molecular weight protein component of the pellicle (Fig. 2). Molecular mass of this protein corresponds to salivary agglutinin (gp340).

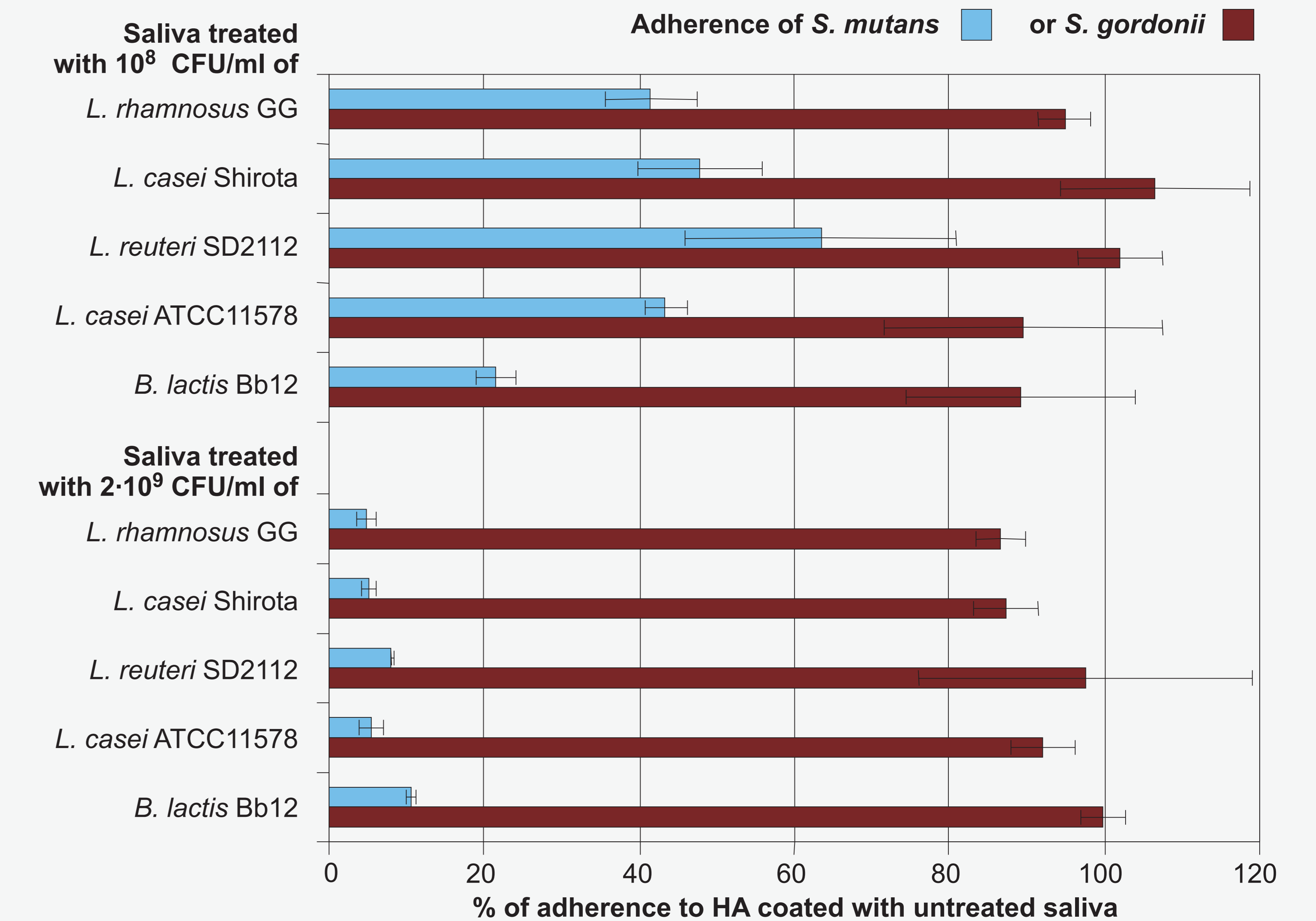


Figure 1: Adherence of *S. mutans* and *S. gordonii* on hydroxyapatite coated with parotid saliva treated with lactobacilli or *Bifidobacterium*. Adherence to untreated parotid saliva = 100 %

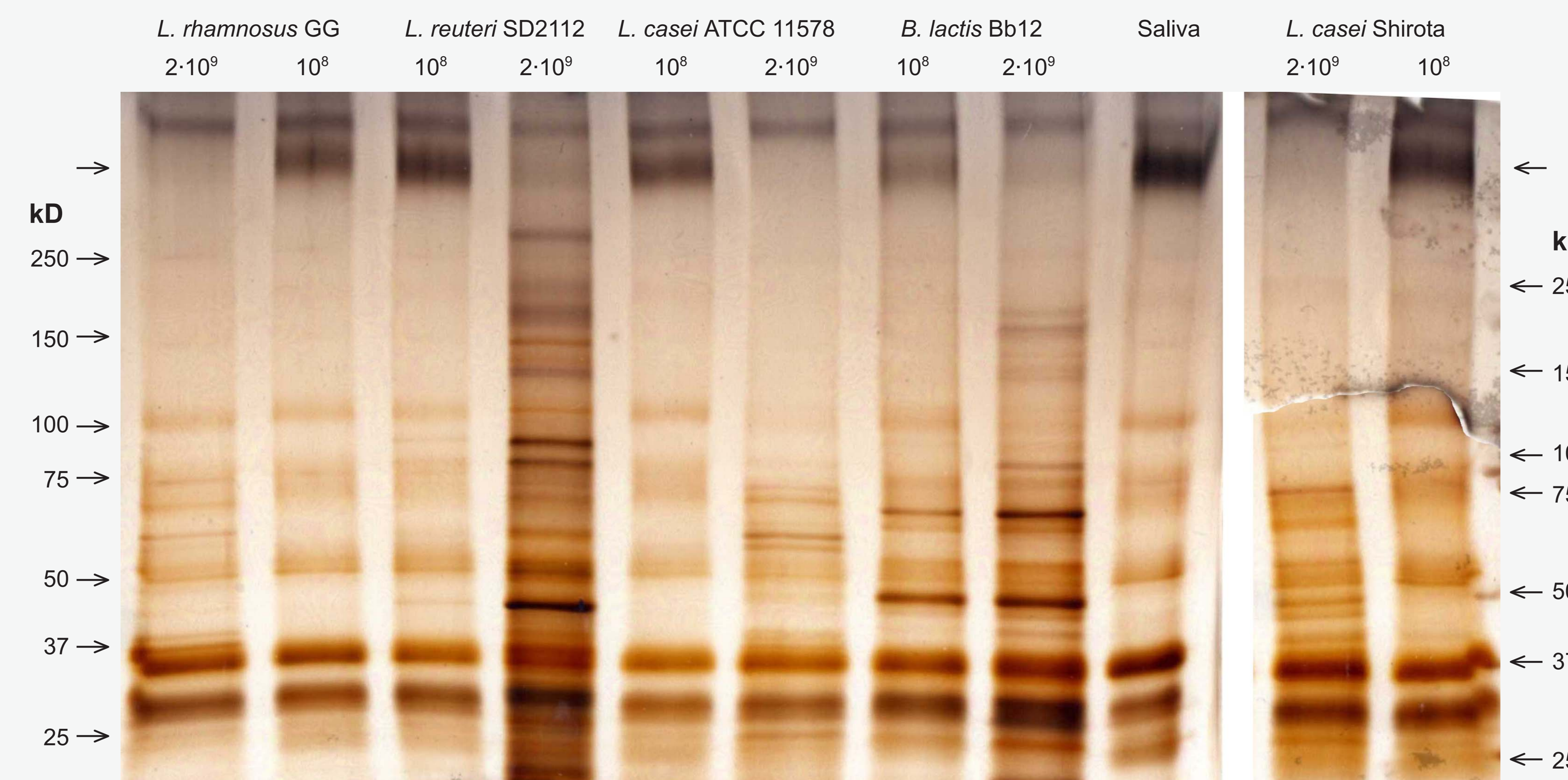


Figure 2: Silver stained proteins recovered from hydroxyapatite. Parotid saliva was incubated with 10<sup>8</sup> or 2·10<sup>9</sup> CFU/ml of bacteria for 3 h. The missing HMW band and the molecular mass standards are indicated with arrows.

## Conclusion

Lactobacilli and *B. lactis* Bb12 affect the composition of the salivary pellicle on HA and thereby inhibit *S. mutans* but not *S. gordonii* adherence *in vitro*.

This study is supported by Turku University Central Hospital and Hilikka Brusiin foundation.