The annual meeting of Taiwan Lactic acid bacteria (TLAB) 2006

The Search for Probiotic Lactic Acid Bacteria (LAB) and Their Application in Human

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Taiwan University, Taipei, Taiwan

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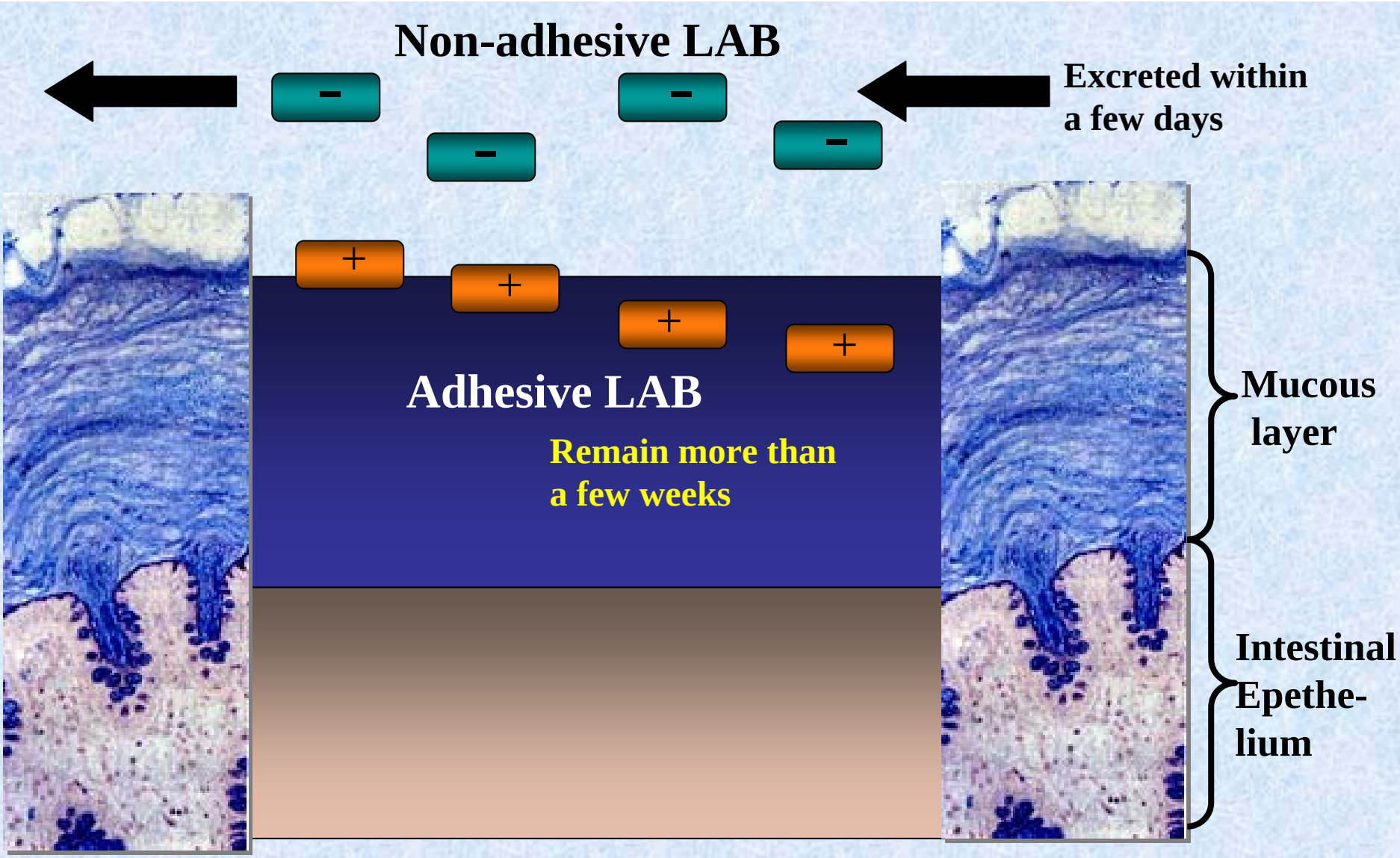
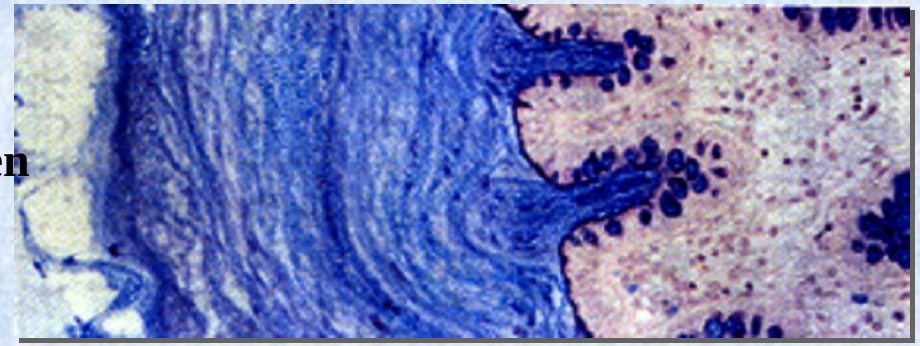


Adhesive LAB can survive in intestine more than non-adhesive LAB!

Adhesive activity is one of the important characteristics of Probiotics.



Mucous layer

epethelium

Human colonic mucin (HCM)

NeuAc

α2-6

GalNAcα1-3Galβ1-3GlcNAcβ1-3Galβ1-4GlcNAcβ1-3GalNAcα1---The(Ser)

A-antigen !

α1-2

Fuc

+-OSO_3^-

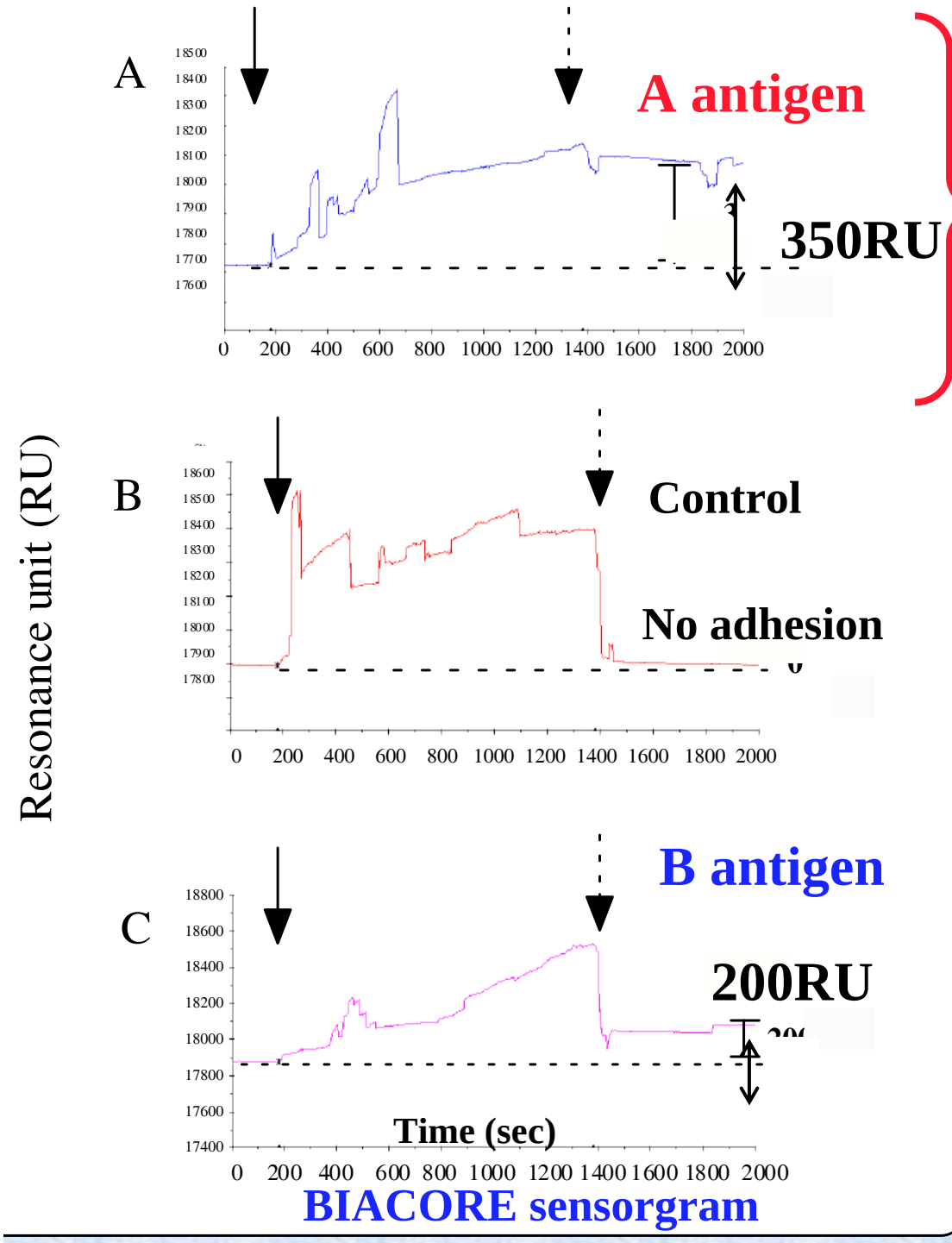
Terminal

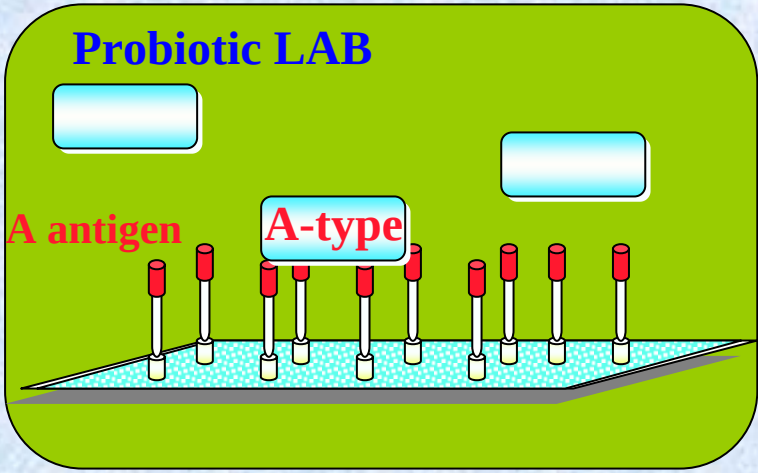
Skeleton

Core

Chemical structure of sugar chain combined to human colonic mucin

(Podolsky *et al.*, *J. Biol. Chem.*, 260, 8262 (1985)

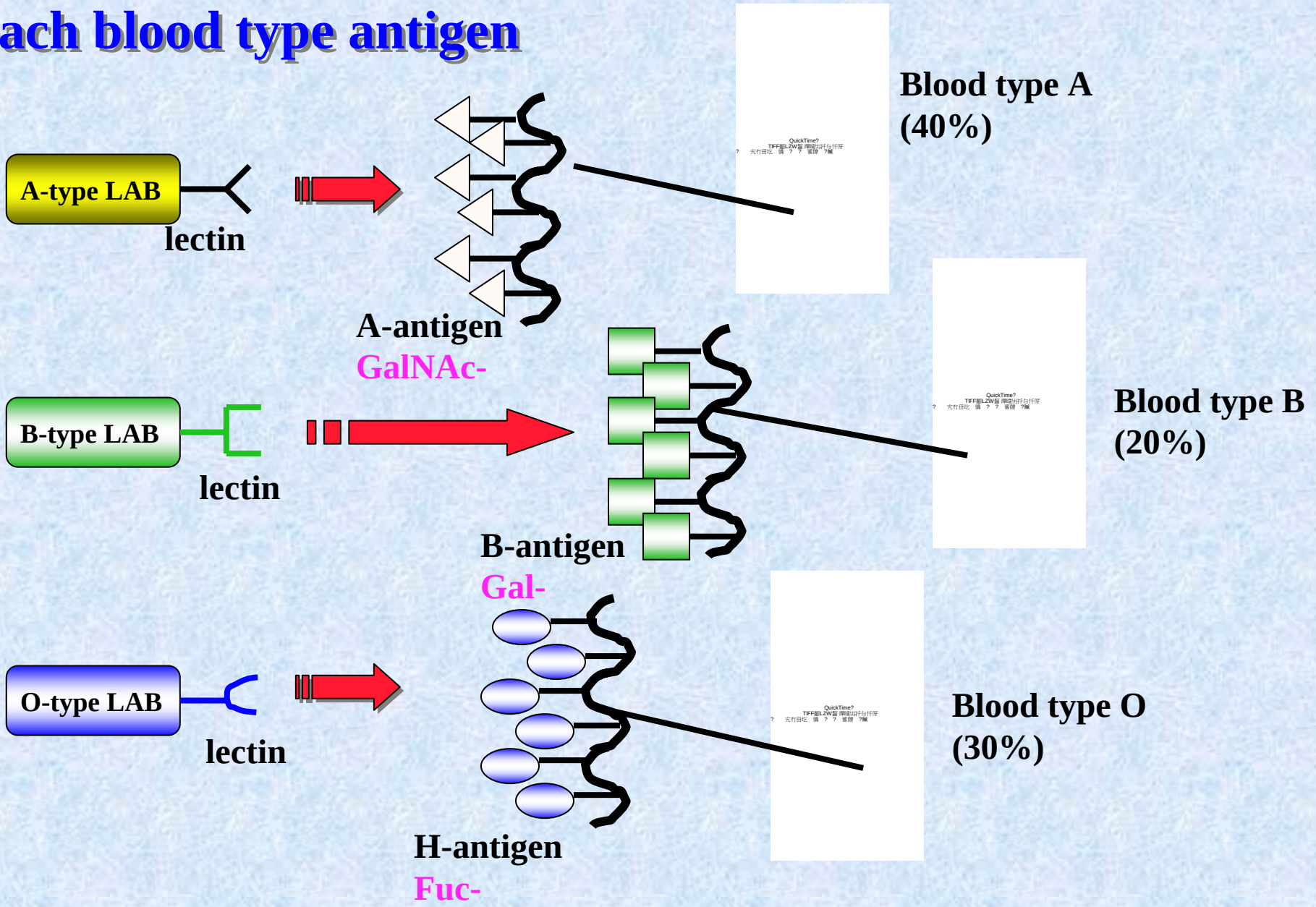




The existense of LAB which can recognize A-type antigen more stronger than B-type antigen was first isolated.

Uchida, Saito *et al. Biosci. Biotechnol. Biochem.*,68, 1004-1010, 2004

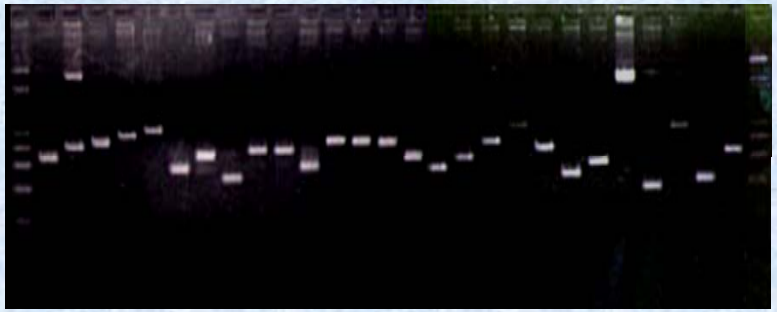
Existence of LAB which can recognize each blood type antigen



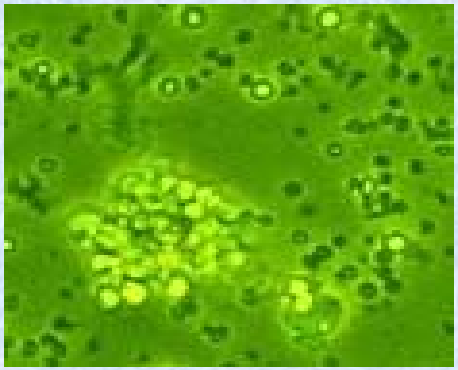
Discovery of immunostimulatory ODN-motif

genome DNA from immunobiotic LAB

Digested & Cloning



Mitogenic activity



Splenocytes or Peyer's patches cells from murine

Scintillation counter
LS1801, Beckman Coulter

Immunostimulatory consensus sequence including CpG or AT-motif

Immunostimulatory ODN from LAB

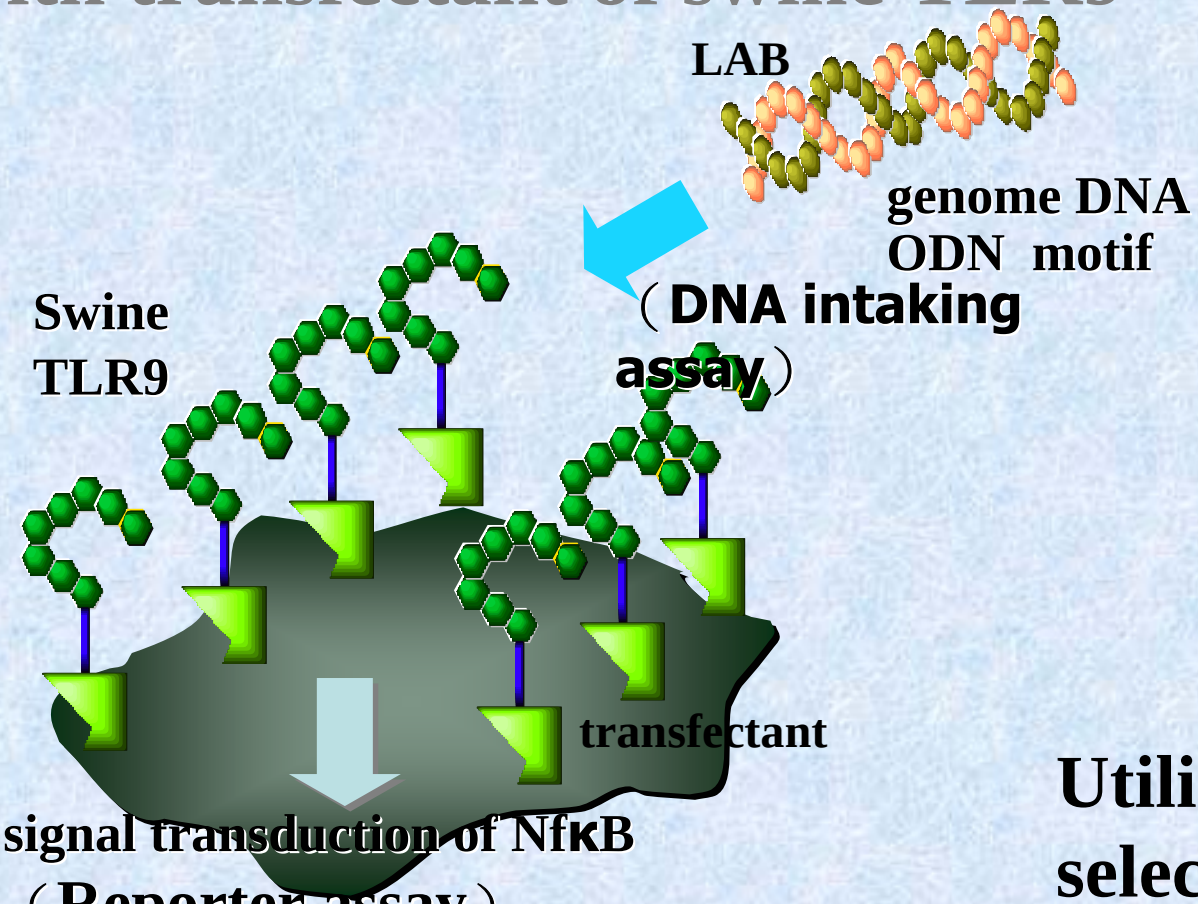
Name & Sequence	Reference & Source
ID35 ACTTTCGTTTTCTGCGTCAA	Iliyan *et al*. Cell. Microbiol. 2004 *L. rhamnosus* GG genome
MsST CAGGACGTTGTATCACTGAA	Kitazawa *et al*. *submitted* *S. thermophilus* ATCC19258 lacZ gene
AT5ACL TATAATTTTTACCAACTAGC	Kitazawa *et al*. Int. J. Food. Microbiol. 2001 *L. gasseri* JCM1131^T genome
OLLB-7 CGGCACGCTCACGATTCTTG	Kitazawa *et al*. Int. J. Food. Microbiol. 2003 *L. bulgaricus* NIAIB6 genome
BL-7 GCGTCGGTTTTCGGTGCTCAC	Takahashi *et al*. *submitted* *B. longum* BB536 genome

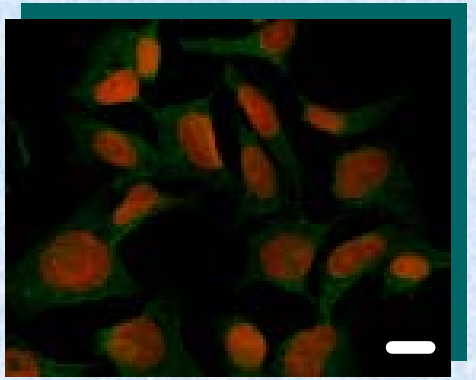
Cf. Mouse, rabbit type
CpG 1826
TCCATGACGTTCCTGACGTT

Kriege *et al*., Nature, 1995
E. coli

(Human: TCGT, Swine: TCGT or TCGA)

Establishment of a new evaluation system with transfectant of swine TLR9

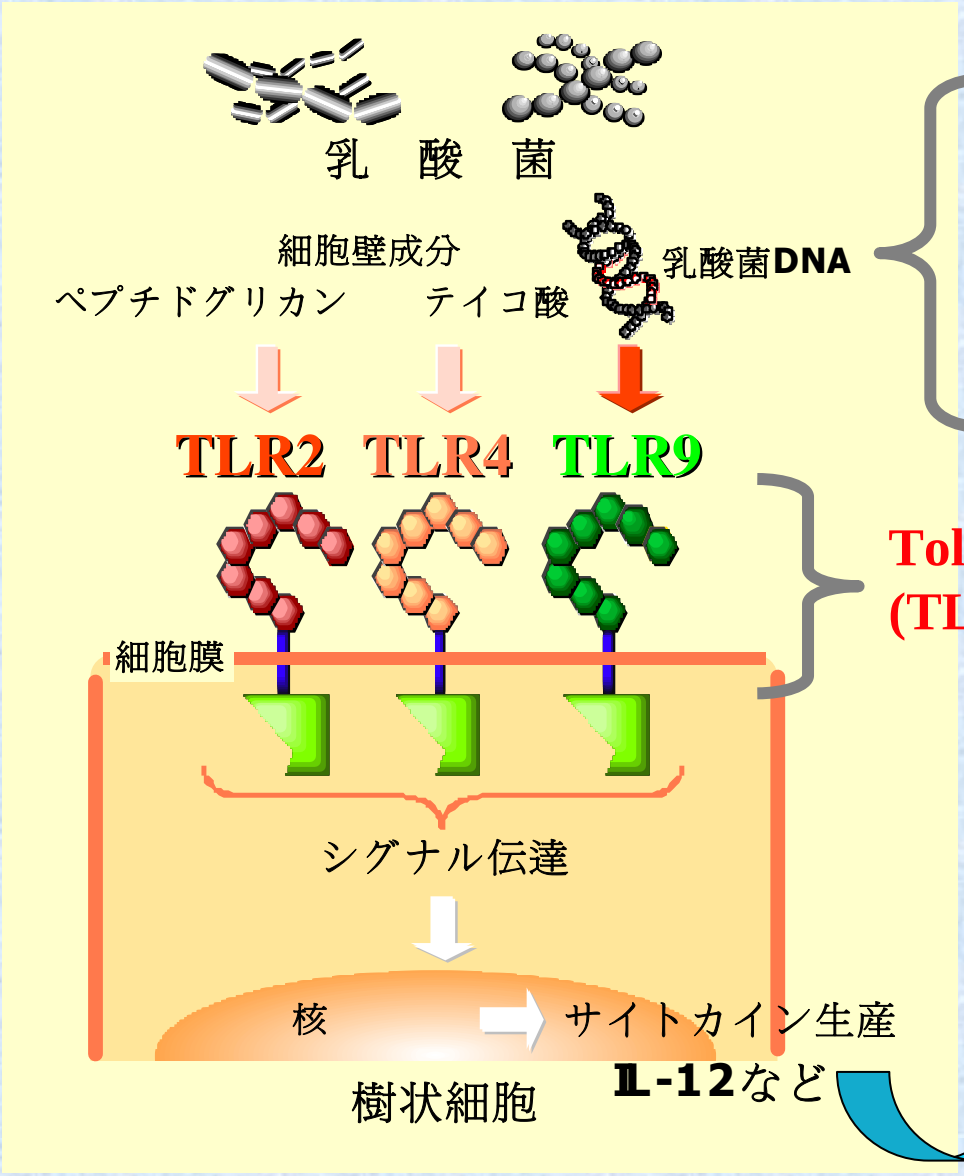




Transfectant expressed swine TLR9 in CHO cell

Utilization of LAB selected by a new evaluation system with three assays

Components from LAB incorporated from intestinal M cell can reduce allergy symptoms !



Immunostimulating ODN motif

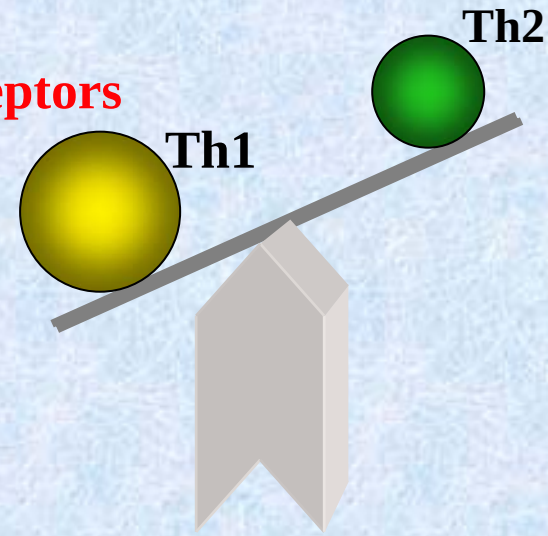
OLLB7 (*L.bulgaricus* NIAI B6)

5’-CGGCACGCTCACGATTCTTG-3’

OLLG7L(*L.gasseri* JCM1131^{T})

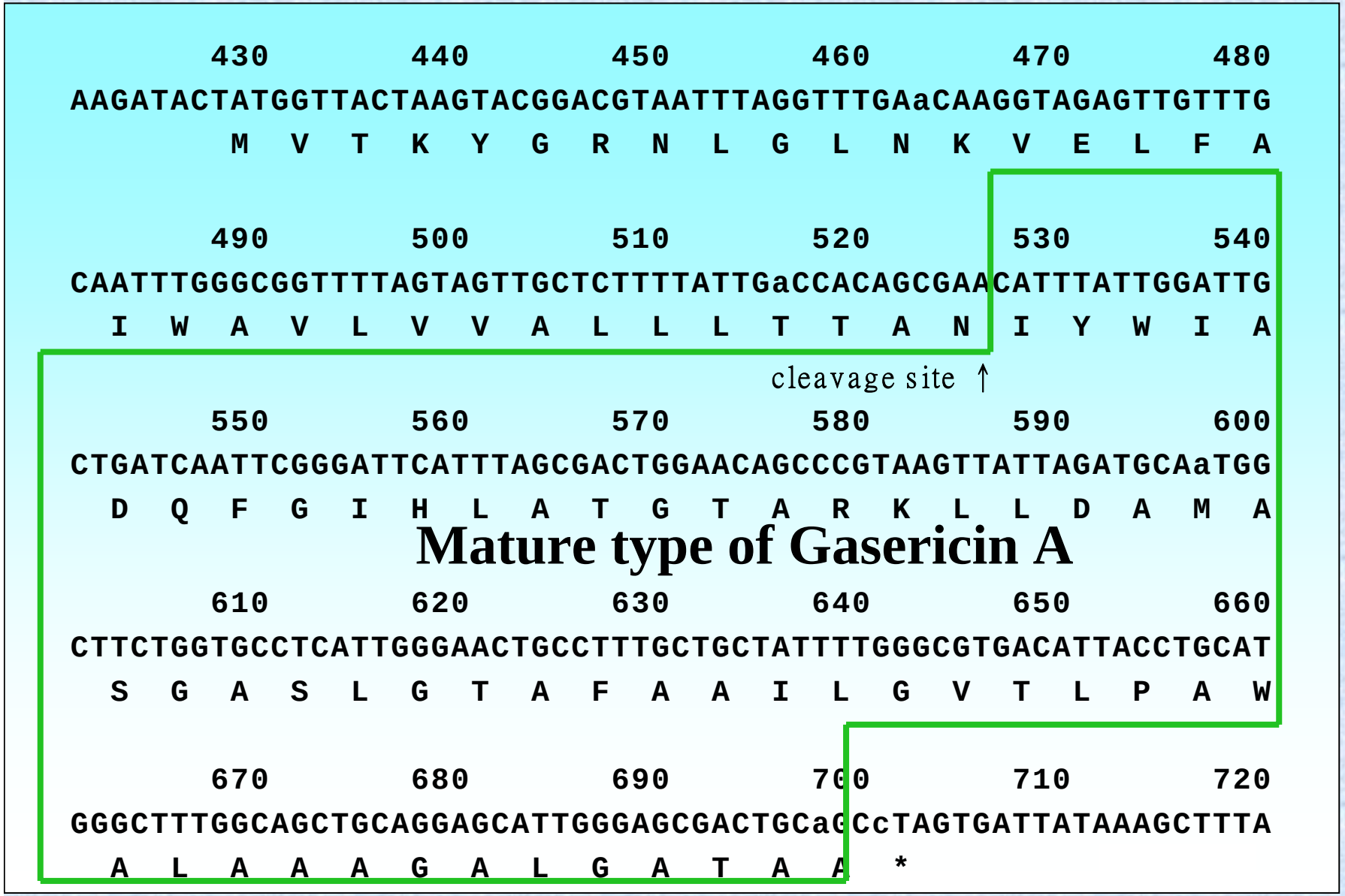
5’-ATTTATTATATGACTTAGCT-3’

Toll-like receptors (TLR1-13)



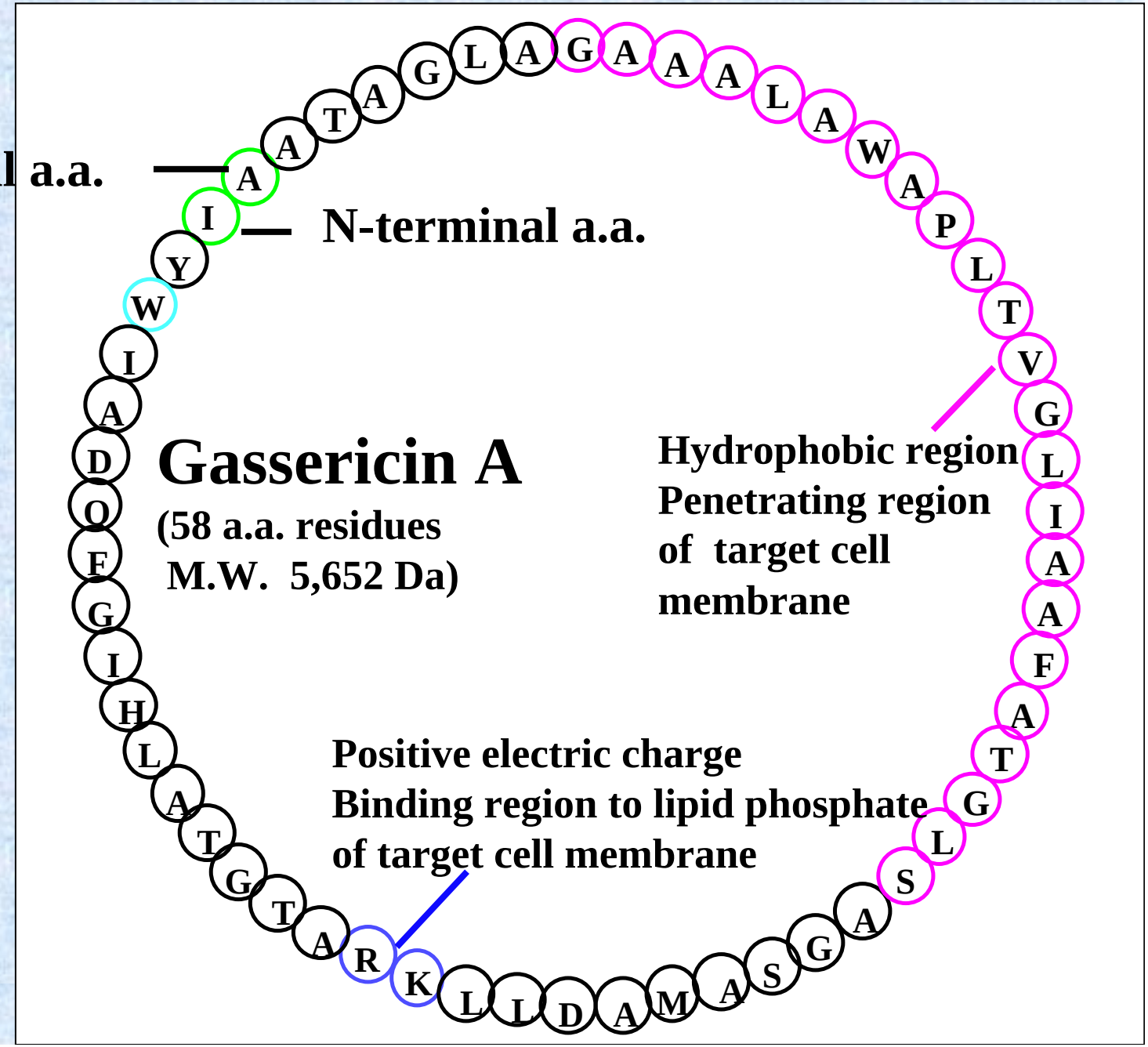
Change the balance of helper T lymphocytes and reduce allergy symptoms

Structural gene (ORF) of Gassericin A produced by *L. gasseri* LA39



(Kawai, Saito *et al.*, *Biosci. Biotechnol. Biochem.*,62, 887-892 (1998))

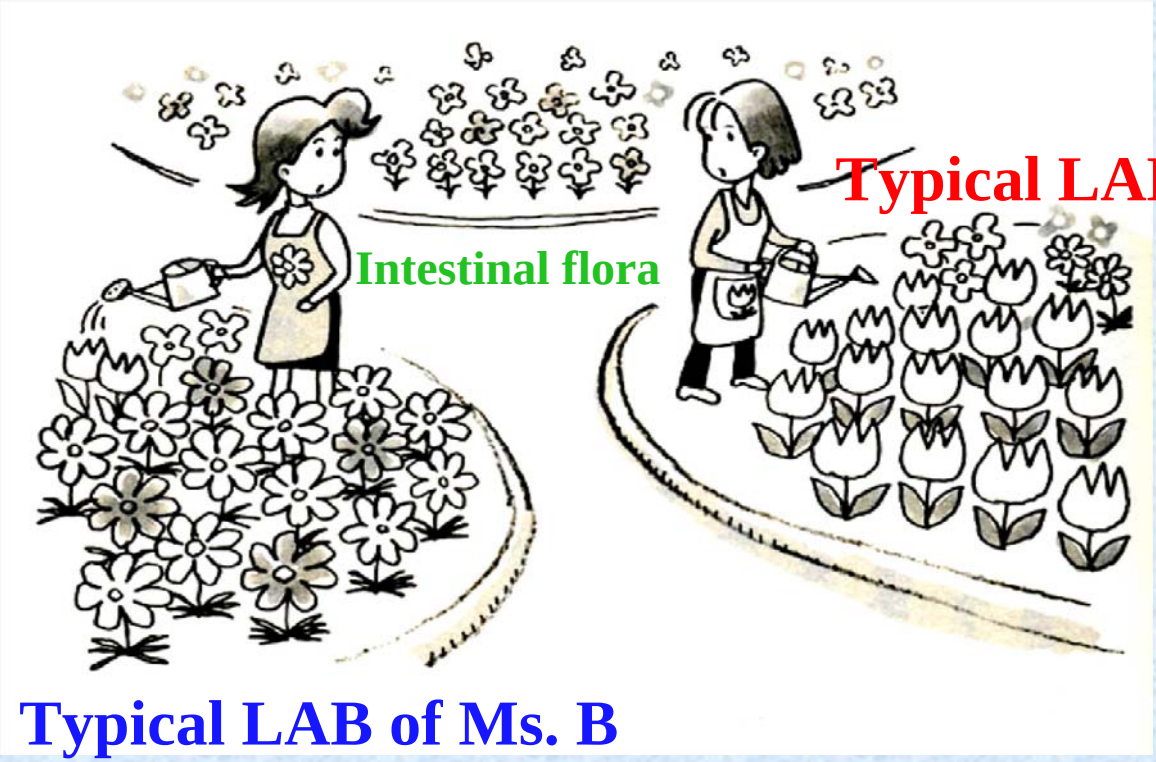
Cyclic structure and characteristics of Gassericin A



Two D-Ala ?
Ala 18/total 58

(Kawai, Saito *et al.*,
Appl. Environ. Microbiol.,
70, 2906-2911, 2004)

Each person can maintain health in whole body through keeping a good intestinal flora



What is future research subject ?

In personal level

- **Search and utilization of high adhesive LAB to human intestine**
- **Competitive exclusion of pathogenic bacteria by probiotic LAB**
- **Addition of lacking LAB to personal intestinal flora**