ACSTM Asian Conference on Science, Technology & Medicine

Lactobacillus acidophilus: enhancing immunity through IL-6 induction

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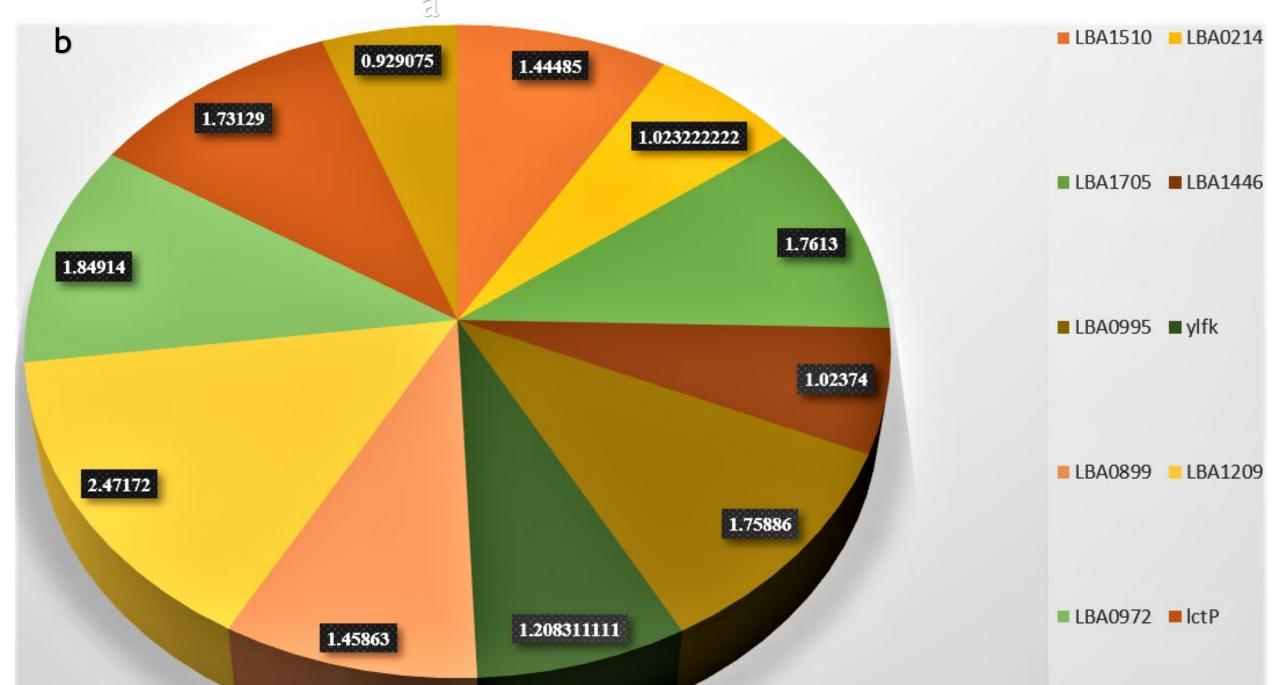
Introduction

- Animal foods are important to human health. \checkmark
- Intensive production system is adopted to improve animal production.
- Stress associated with confined animals may affect their productivity \checkmark and lead to pathogenic colonization.
- Feed additives such as probiotics are necessary to overcome the \checkmark aforementioned problems but their functions are not fully understood.

Objective

To investigate interleukin-6 inducing capacity of selected uncharacterized proteins of Lactobacillus acidophilus

Materials and methods



Sequence retrieval and analysis

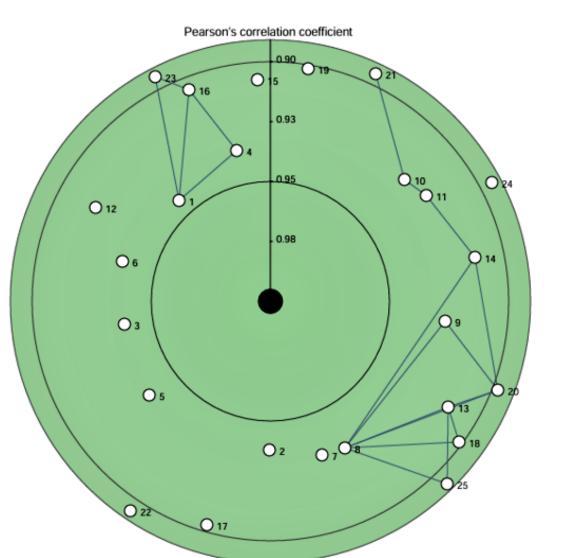
- Reference genome of Lactobacillus acidophilus (CP005926.2) \checkmark sequence was retrieved from NCBI.
- Protein families were sorted in PATRIC. \checkmark
- 14 uncharacterized proteins were randomly selected for IL-6- \checkmark inducing analysis
- IL-6-inducing capability was done using il6pred \checkmark

Lead Gene: II6 from selection: MM-

- IL-6 co-expression was done using GENEVESTIGATOR V
- Physicochemical properties were investigated using ExPASy \checkmark ProParam

Results

12 cancer categories from data selection: MM_AFFY_430_2-1



	Score	Gene	Description
01	0.94	Prrx2	paired related homeobox 2
O 2	0.94	Twist1	twist basic helix-loop-helix transcription factor 1
O 3	0.94	Ehd2	EH-domain containing 2
04	0.94	Bdnf	brain derived neurotrophic factor
O 5	0.94	Htr1b	5-hydroxytryptamine (serotonin) receptor 1B
6 🔾	0.94	Mast4	microtubule associated serine/threonine kinase fami
Ö7	0.93	Cilp	cartilage intermediate layer protein, nucleotide pyrop.
08	0.93	Ltbp2	latent transforming growth factor beta binding protein
С 9	0.93	Hmga2	high mobility group AT-hook 2
) 10	0.92	Piezo2	piezo-type mechanosensitive ion channel componen.
O 11	0.92	Mir6950	microRNA 6950
O 12	0.92	Srpx	sushi-repeat-containing protein
O 13	0.91	Timp1	tissue inhibitor of metalloproteinase 1
O 14	0.91	Lox	lysyl oxidase
O 15	0.91	Fosl1	fos-like antigen 1
) 16	0.90	Has2	hyaluronan synthase 2
O 17	0.90	Ltbp1	latent transforming growth factor beta binding protein
) 18	0.90	Mrc2	mannose receptor, C type 2
O 19	0.90	Ankrd1	ankyrin repeat domain 1 (cardiac muscle)
20	0.90	Tnc	tenascin C
O 21	0.89	Dnm3os	dynamin 3, opposite strand
22	0.89	Cx3cl1	chemokine (C-X3-C motif) ligand 1
C 23	0.89	Foxg1	forkhead box G1
24	0.89	Myof	myoferlin
25	0.89	Fap	fibroblast activation protein

LBA0338

LBA0972

LBA1209

LBA0899

LBA0995

LBA1446

LBA1705

LBA0214

LBA1510

■ ylfk

IctP

LBA0338

Figure 2. Immunogenic IL-6-inducing peptides from uncharacterized proteins of L. acidophilus reference genome: a. according to their IL-6-inducing prediction values; b. according to their immunogenicity values

Table I. Physicochemical properties of selected uncharacterized proteins of Lactobacillus acidophilus

Proteins	#AA	ΑΙ	pl
LBAI5I0	859	110.70	9.43
LBA0214	255	87.88 I 38.39	5.61 9.60
LBA1705	93		
LBA1446	490	121.20	9.66
LBA0037	265	104.38	9.21
LBA1825	87	78.39	9.80
LBA0995	490	104.71	8.64
LBA1788	69	104.49	6.55
yifk	457	122.04	9.25
LBA0899	463	II7.49 I05.21 I21.97 I35.28	9.49 9.10 9.43 8.41
LBAI209	292		
LBA0972	295		
LctP	505		
LBA0338	252	128.10	9.61
	·	nmary	ooint,;AI = aliphatic index
 ✓ The theoretica (LBA1825) ✓ The aliphatic in ✓ Al scores range ✓ 79% of the sele ✓ LBA0037, LBA inducing peptic 	idex (Al) scores wer ed from 138.39 (LBA ected proteins produ 1825 and LBA1788 p les	re generally high A 1705) to 78.39 (LE uced immunogenic l produced non-immu	I (LBA0214) and 9.80 BA1825)

Show only genes with correlation above: 0.894

Connect genes with mutual correlation at least: 0.955

Figure I. A circular view of positively co-expressed genes with IL-6 in Mus musculus across various anatomical, neoplasm and cell categories

