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APPENDICES

APPENDIX A

List of chemicals and materials used in this study

All chemicals used in this study were analytical grade or equivalent.

1. Chemicals were obtained from:

Bio-Rad

Coomassie brilliant blue R250

RNA purification kit

Dako

Mounting solution, mouse-IgG blocking solution, diaminobenzidine (DAB), hematoxylin, neural buffer formalin, 10% goat serum

Merk

silica gel No. 7734

Nacalai

Hydrochloric acid, sodium hydroxide, ethanol, methanol, glutaraldehyde, dimethyl sulfoxide (DMSO), formaldehyde, potassium ferricyanide, potassium ferrocyanide, potassium chloride, potassium phosphate dibasic, potassium phosphate monobasic, butanol, acetate, acetone, distilled water HPLC grade, hydrogen peroxide, ammonium persulfate, TEMED, glycerol

PerkinElmer Life Sciences

Western Lightning^{TM} Plus-ECL

Pierce

Restore^{TM} Western blot stripping buffer

Seikagaku

Hyaluronan, hyaluronan binding protein (HABP), biotinylated HABP

Sigma

Sodium chloride, DMEM, DMEM Ham's F12, laminin, bovine serum albumin, fetal calf serum, penicillin, streptomycin, trypsin, EDTA, TRIZMA-HCl, TRIZMA-Base, xylene, magnesium chloride, citric acid, X-gal (5-bromo-4-chloro-3-indosyl-β-D-galactopyranoside), dimethyl formamide (DMF), urea, potassium acetate, cyanoacetamide, calcium chloride, Triton X-100, paraformaldehyde, glyceraldehyde, acetaldeh yde, low melting agarose, collagenase type IA, tetrazolium compound MTT, gelatin

Takara

Extaq DNA polymerase buffer, dNTP

Tissue-Tek®

O.C.T compound

Toyobo Life Science

Can Get Signal™

Vector Lab

biotinylated peanut agglutinin

2. Antibodies were obtained from:

Cell Signal Technology

Anti-phospho-smad2/3, anti-phospho-ERK1/2, anti-rabbit IgG-HRP, anti-goat IgG-HRP

Chemicon

anti-versican GAG beta domain, anti-CD44

Dako

Anti-Ki67

Epitomics

anti-β-catenin

Invitrogen

Alexa Fluor 594 streptavidin, Alexa Fluor 594 anti-rabbit IgG, Alexa Fluor 488 anti-mouse IgM, Alexa Fluor 488 anti-mouse IgG

Molecular Probe

Alexa Fluor 594

Novagen

anti-Cre

R&D Systems

anti-TGF-β

Santa Cruz

anti-TβRII

Seikagaku

anti-CS (LY111)

Sigma

Anti-actin

3. Enzymes were obtained from:

Calbiochem

β-galactosidase

Dako

Streptravidin-HRP, LSAB2 kits, biotinylated-linked streptavidin

Seikagaku

Chondroitinase ABC

Sigma

DNase, Bovine testicular hyaluronidase

Takara

ProtenaseK, RNase A, Extaq DNApolymerase

4. Primers were obtained from:

Rikaken

Int1-1, Kpn-1, *Prx1*-Cre forward, *Prx1*-Cre reverse, HR113, HR114, 001 forward, 002 reverse

5. Mice were obtained from:

Jackson Labolatory, Bar Harbor, ME

ROSA26 mice

APPENDIX B

List of equipments used in this study

Instrument	Model
Agarose gel electrophoresis machine	Mupid 2X
Analytical Balance	Sartorious
Autoclave	TOMY SS-320
Biosafety cabinet	Hitachi
Camera	Olympus DP71, Nikon CoolPix 995, Olympus DP12
CO_2 incubator	Napco 6200
Confocal laser scanning microscopes	LSM 710 Carl Zeiss MicroImaging, Tokyo, Japan
Cryosection machine	Leitz
DNA sequencer	Applied Bioscience
ELISA plate	Nunc
Fluorescent microscope	Olympus
Gel Documentator	Mitsubishi AP 9500/A
LAS 4000 mini, luminescent image analyzer	Fujifilm
LabTek-II chamber slides	Nalge nunc International, Tokyo, Japan
Light microscope	Olympus
Magnetic stirrer	Corning

Micro autopipette	Gilson
Microcentrifuge	Eppendorf 5415-D
Microscope	Zeiss Stemi SV11, Olympus SZX12, Olympus BX50
PCR machine	Applied Biosystem
Peristaltic pump	Millipore
pH meter	Corning
Plastic dish	Becton Dickinson
Power supply for PAGE electrophoresis	Nihon EIDO NC1010
Refrigerated centrifuge	Kubota 1720
Spectrophotometric microplate reader	Thermo Scientific
Superfrost Mascot slides	Matsunami Glass Inc, Osaka, Japan
UV light illuminator	AI-C Epi-lightUV FA 2000
Vortex mixer	Vortex-Genie2
Water bath incubator	TAITEC
X-ray apparatus	Softex, Tokyo, Japan

APPENDIX C

Reagents and Buffers preparation

1. Reagents for cell culture

Complete DMEM medium

DMEM medium	500	ml
Fetal Calf Serum	10	ml
Pennicillin/Streptomycin	5	ml

Phosphate Buffer Saline

NaCl	80	g
KCl	2	g
Na_2HPO_4	14.4	g
KH_2PO_4	2.4	g

All are dissolved to 1 L of distilled water, was adjusted pH to 7.4. The solution will be diluted 10 times with distilled water to achieve working PBS buffer.

2. Reagents for electrophoresis

Tris Buffer Saline (TBS) buffer for agarose gel electrophoresis

$C_4H_{11}NO_4$	24.2	g
NaCl	80	g

All are dissolved to 1 L of distilled water, was adjusted pH to 7.6 with concentrated HCl. The solution will be diluted 10 times with distilled water to achieve working TBS buffer.

3. Reagents for ELISA

3.1 Tris Incubation buffer

BSA	1.0 g
Tween-20	1.0 ml
NaCl	8.77 g
Tris-HCl	1.21 g

All reagents were dissolved in 900 ml of distilled water, were adjusted pH to 7.4 and made up volume to 1 L. Stored at 4°C.

3.2 Citrate phosphate buffer

Citric acid monohydrate	10.30 g
$Na_2HPO_4 3H_2O$	18.16 g

All reagents were dissolved in 900 ml of distilled water, were adjusted pH to 5.0 and made up volume to 1 L, and stored reagent at 4°C.

3.3 Substrate

OPD	8 mg

4. X-gal staining solution

4.1 staining solution for cryosections

X-Gal	1 mg/ml
$K3Fe(CN)_6$	5 mM
$K4Fe(CN)_6$	5 mM
$MgCl_2$	2 mM
Deoxycholate	0.01%
Nonidet P-40	0.02%

4.2 staining solution for micromass culture

Citric acid	0.1 M
sodium phosphate pH 6.0	0.2 M
$K3Fe(CN)_6$	5 mM
$K4Fe(CN)_6$	5 mM
NaCl	150 mM
$MgCl_2$	2 mM

PUBLICATIONS FOR THESIS

- Effect of *Alpinia galanga* extract on cartilage degradation and on gene expression in human chondrocyte and synovial fibroblast metabolism. PeraphanPothacharoen, **Kanyamas Choocheep**, Tanyaluck Pitak, Wilart Pompimon, Bhusana Premanode, Timothy E. Hardingham, Prachya Kongtawelert. Central European Journal of Biology. 2006, 1(3): 430-450.

- Versican/PG-M assembles hyaluronan into the extracellular matrix and inhibits CD44-mediated signaling toward premature senescence in embryonic fibroblasts. Keittisak Suwan, **Kanyamas Choocheep**, Sonoko Hatano, Prachya Kongtawelert, Koji Kimata, and Hideto Watanabe. Journal of Biological Chemistry. 2009, 284(13): 8596-8604.

- Versican facilitates chondrocyte differentiation and regulates joint morphogenesis. **Kanyamas Choocheep**, Sonoko Hatano, Hidekazu Takagi, Hiroki Watanabe, Koji Kimata, Prachya Kongtawelert, and Hideto Watanabe. Journal of Biological Chemistry . 2010, 285(27): 21114-211125.

CURRICULUM VITAE

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Education

1988-1993	Primary school at Chomchon Ban Koo Papaoprachanukrao school, Chiang Rai, Thailand
1993- 1999	Secondary and High school at Dara Academy, Chiang Mai, Thailand
1999-2003	B.Sc. (Medical Technology), Faculty of Associated Medical Science, Chiang Mai University, Chiang Mai, Thailand
2005-2010	Ph.D. student in Department of Biochemistry, Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand

Research experiences

- June 2004-2010: Ph.D student in Thailand Excellence Center for Tissue Engineering and Stem Cells, Department of Biochemistry, Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand

- April 2007-August 2009: Fellowship Researcher in Institute for Molecular Science of Medicine, Aichi Medical University, Aichi, Japan

Presentation and Publication

- Oral presentation: Kanyamas Choocheep, Sonoko Hatano, Hidekazu Takagi, Hiroki Watanabe, Koji Kimata, Prachya Kongtawelert, and Hideto Watanabe. Versican facilitates chondrocyte differentiation and regulates joint morphogenesis. The Annual Seminar of Biochemistry, 9th August 2009, Chiang Mai, Thailand.

- Poster presentation: Kanyamas Choocheep, Sonoko Hatano, Hidekazu Takagi, Hiroki Watanabe, Koji Kimata, Prachya Kongtawelert, and Hideto Watanabe. Versican facilitates chondrocyte differentiation and regulates joint morphogenesis. The RGJ-Ph.D. congress XI, 1st-3rd April 2010, Pattaya, Chonburi, Thailand.

- Oral presentation: Kanyamas Choocheep, Sonoko Hatano, Hidekazu Takagi, Hiroki Watanabe, Koji Kimata, Prachya Kongtawelert, and Hideto Watanabe. Versican facilitates chondrocyte differentiation and regulates joint morphogenesis. The RGJ Seminar series LXXII, 2nd July 010, Chiang Mai, Thailand.

Article's in process to publish

- Peraphan Pothacharoen, Kanyamas Choocheep, Thanyaluck Phitak, Wilart Pompimon and Prachya Kongtawelert. *Alpinia galanga* extracts down regulate interleukin-1β-induced matrix metalloproteinases expression in human synovial fibroblasts (accepted).

  In process to publish in the Journal of In Vitro Cellular & Developmental Biology-Animal.