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2003 2

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2002 12 20

- -

I, II, III, V

Matrix

metalloproteinase I, III

. 가
, . I
, II
. III
가 가 ,
V .
MMP I MMP III
.

: , , Matrix metalloproteinase

	.....	1
	.....	2
	.....	3
I.	.....	4
II.	.....	6
III.	.....	7
A.	.....	7
B.	.....	7
C.	Hematoxylin-Eosin , alcian-blue	9
IV.	.....	10
V.	.....	15
VI.	.....	22
	.....	23
	.....	31

Fig. 1. The expression of collagen I (x 400)

Fig. 2. The expression of collagen II (x 400)

Fig. 3. The expression of collagen III (x 200)

Fig. 4. The expression of collagen V (x 400)

Fig. 5. The expression of MMP I (x 400)

Fig. 6. The expression of MMP III (x 400)

I.

2

proteoglycan gel

collagen fibril

10,31

, 7

3,4,13

가

6

Matrix metalloproteinase(MMP)

20가

가

MMP I MMP III

. MMP I interstitial collagenase

, MMP III

36

II.

34

70

Hematoxylin-Eosin

alcian blue

I, II, III, V

Matrix metalloproteinase I III

, I, II, III, V

Matrix metalloproteinase I,

III

III.

A.

B.

	Hematoxylin-Eosin		(myxomatous
degeneration)	PAS	alcian blue	.
I, II, III, V		I, II, III, V	
(Dako patts. Copenhagen, Denmark)		Matrix metalloproteinase I, III	
(Dako patts. Copenhagen, Denmark)			.

(1) Hematoxylin-Eosin

70

bouin

30

40

formalin

xylene

($6 \pm 2\mu\text{m}$)

4% neutral buffered solution

($6 \pm 2\mu\text{m}$) Hematoxylin-Eosin

(2) PAS

alcian-blue

alcian blue Ig 3% acetic acid 5
 1% periodic acid 5
 15 Schiff's reagent ,
 5 10 Hematoxylin
 , alcohol .

(3)

30 60 56 60 가
 60 xylene
 10 3 peroxidase
 3% (H2O2) methanol 10 15
 3 . Phosphate buffered saline(PBS) 5
 3 goat 20
 30 1 1 2
 . PBS 5 3 . 2 20 30
 5 3 PBS . Labelled serum 20
 PBS . AEC (3-amino-9-Ethyl-Carbazone)
 PBS . Hematoxylin Eosin .
 I, II, III, V 1:100 Matrix
 metalloprotenase I, III 1:50

C. Hematoxylin-Eosin , alcian-blue

Hematoxylin-Eosin , alcian blue

,

.

.

IV.

12 ,
14 , 8 (Table 1).
37 68 , 45.6 .
가
가 7
.
I (Fig. 1),
II (Fig.
2). III ,
(Fig. 3).
V (Fig. 4).
MMP I (Fig. 5) MMP III (Fig. 6)
가 .

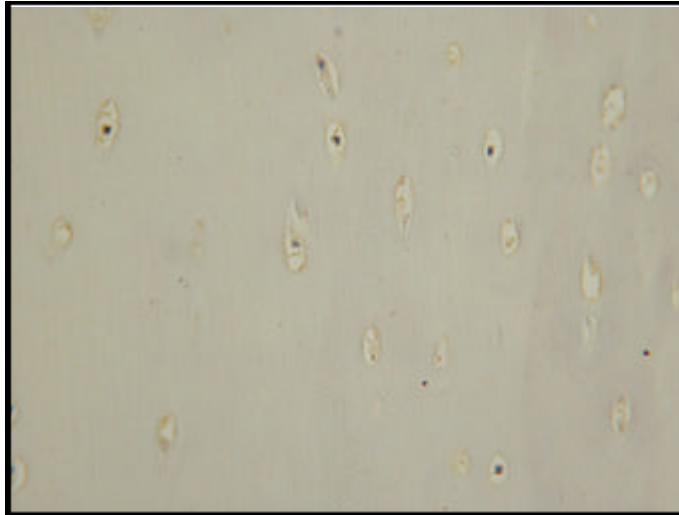


Fig. 1. The expression of collagen I (x 400). Collagen I was not expressed in the endplate.

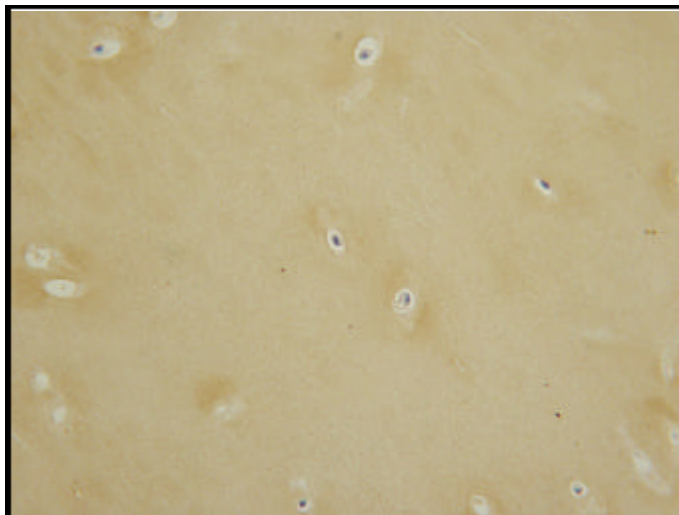


Fig. 2. The expression of collagen II (x 400). Collagen II was expressed in the whole areas of the endplate.

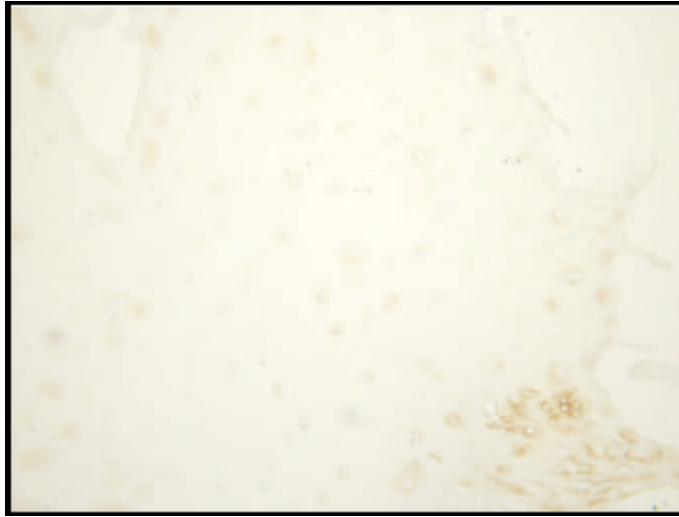


Fig. 3. The expression of collagen III (x 200). Collagen III was expressed in the partial portion of the endplate.

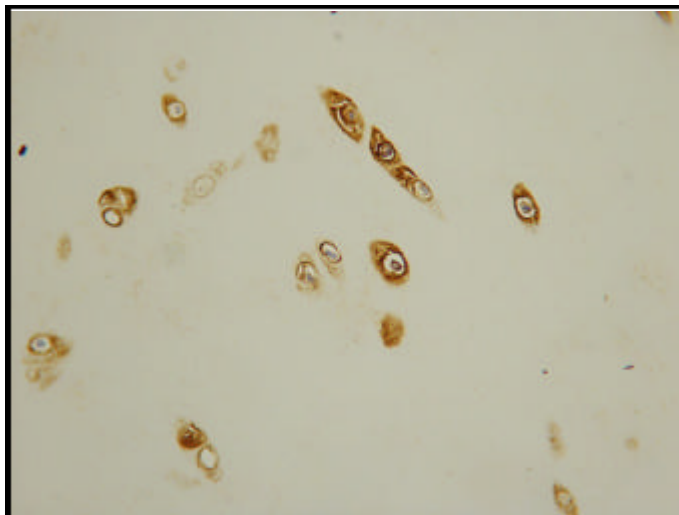


Fig. 4. The expression of collagen V (x 400). Collagen V was mainly expressed in the pericellular areas.

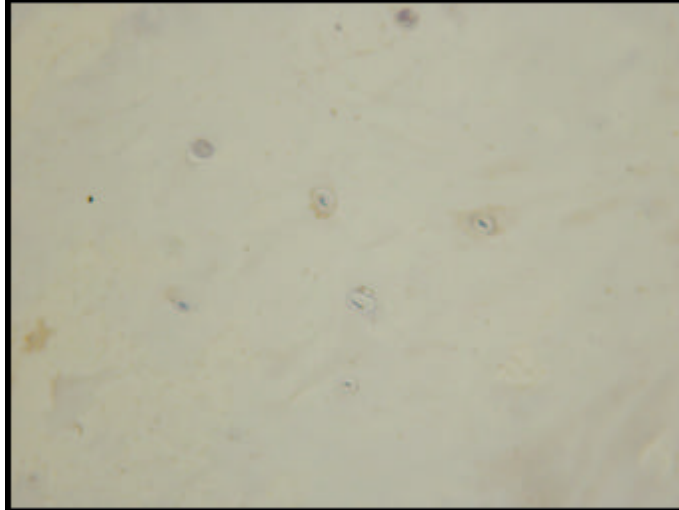


Fig. 5. The expression of MMP I (x 400). MMP I was expressed strongly.

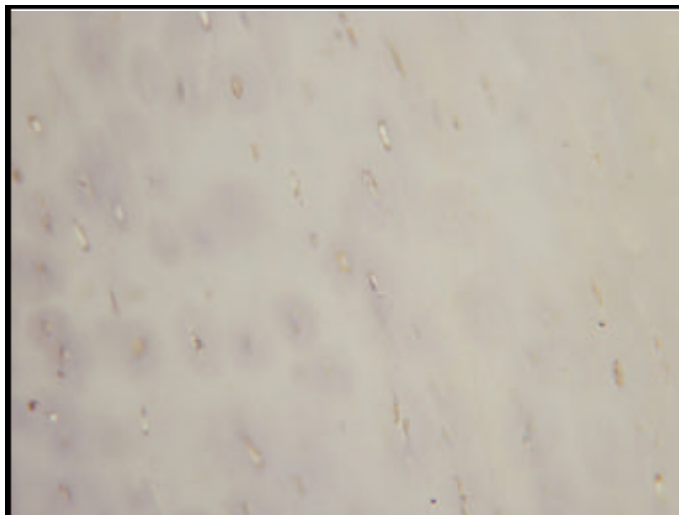


Fig. 6. The expression of MMP III (x 400). MMP III was expressed weakly.

Table 1. Disease entities

Disease	No.
Spondylolisthesis	12
Degenerative disc disease	14
Spinal stenosis	8

Table 2. Result of staings

	Collagen I	Collagen II	Collagen III	Collagne V	MMP I	MMP III
End plate	-	++	+	++	++	+
			weakly	pericellular		Weakly

++ = strongly expressed; + = weakly expressed.

V.

1/3

가

(hydrostatic pressure)

6

3

가

, 7

3,4,13

가

II

15

II

I

II

4

33

가

가

17,18

17,18

crimping

가

가

가

가

proteoglycan

26

21

1mm

49

49

5,10,14

가 가

crimping

가

가

49 .

. Proteoglycan ,

proteoglycan

proteoglycan

50 .

43,48 .

(buds)

. Crock Yoshizawa

1/3

12 .

subchondral

(solute)

54 .

38 .

가

5,37 .

. Roberts 47

가

subchondral bone

(remodeling) 가

(specimen)

41,30

가
가

Matrix metalloproteinase

11,16,23

muscarinic 가

subchondral bone

7

trabecular bone

subchondral bone

가

20

, Natarajan 34

. Vernon- Roberts⁵⁵

가

Tanaka

52

가 .

.
,

Schmorl's node

70%

, ,

Schmorl's node

,

, 50

,

19,56

I

, endostium

III, V, VI

,

V VI

II

가

,

III

V

, VI

II

가

,

II

가

1.

,

6 7%

1.

II

, 5 15

80%

가 , 가

1.

II

1.

III

pericellular

II

IX

35.

Matrix metalloproteinase(MMP) Zinc-dependent proteinase Metzincin family 가

. Matrix metalloproteinase

4

proteinase(serine, cystein, aspartic, metallo)

27.

MMP 18

44. MMP 4

8. MMP I collagenase I, interstitial collagenase,

fibroblast collagenase

, (I, II, III, VII, VIII, X)

45. MMP II 72-kd gelatinase A 72-kd type IV gelatinase

, (IV, V, VII, X, XI), fibronectin, elastin,

45. MMP

MMP

가

MMP , MMP I

39,42

40

. MMP I II

(proteoglycan aggrecans)

60. MMP I

I, II, III, V

, MMP I

57

MMP I

60

60

MMP I

24,51

MMP I

gelatinase

elastase

31

MMP MMP I(collagenase) MMP III(stromelysin)

25,40 MMP III MMP I

, proteoglycans, laminin, fibronectin, gelatin, IV V

9,32,46,58,59 MMP III

(core protein)

36

MMP I MMP III가

28 MMP III

22

MMP I MMP III가

, MMP I

MMP III

가

VI.

가 ,

.
I , II

. III

, V

MMP I

MMP III

가

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Metalloproteinases and inflammation in lumbar disc herniation. *Spine*, 23(8):863-69,

1981

-Abstracts-

The changes of the cell and extracellular matrix according to the degeneration in the vertebral endplate

Yong Ho Kang

Department of Medical Sciences

The Graduate School, Ajou University

(Supervised by Associate Professor Chang-Hoon Jeon)

In this study, there were some results for the histologic studies with collagen I, II, III, V and matrix metalloproteinase I, III in the degenerated vertebral endplate.

According to the degeneration, there was a tendency to decrease the thickness of the endplate and were some myxomatous changes. The chondrocyte cluster was not found in the endplate.

Collagen I was not expressed and collagen II was expressed in the whole areas of the endplate. Collagen III was expressed in the partial portion of the endplate and it seemed to be associated with the areas of the degeneration and disorganization. And collagen V was expressed in the pericellular pattern.

MMP I and MMP III were expressed in the endplate. And MMP I was expressed

strongly than MMP III.

Key words : Vertebral endplate, Collagen, Matrix metalloproteinase