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Matrix

Metalloproteinase-1

Matrix Metalloproteinase-

2

Matrix

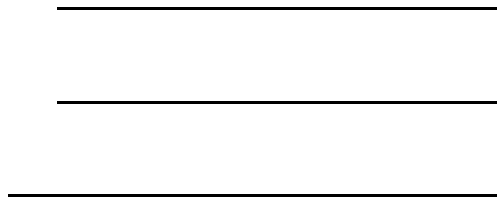
Metalloproteinase-1

Matrix Metalloproteinase-

2

2 0 0 1 2

.



2 0 0 0 12 22

- -

Matrix Metalloproteinase-1 Matrix

Metalloproteinase-2

,
Matrix

Metalloproteinase(MMPs) 가 . MMPs

, , ,

. ,

. MMP-1

I, II, III, X

,

MMP-2

. 가

matrix metalloproteinase-1(MMP-1) matrix metalloproteinase-

2(MMP-2)

,

, MMPs 가

가 .

Hematoxylin-eosin

MMP-1 MMP-2

MMP-1 MMP-2

MMP-1 MMP-2 ,

,

MMP-1 . MMP-2

가

가

: , Matrix metalloproteinase-1, Matrix metalloproteinase-2

I .	-----	1
.	-----	3
III.	-----	4
A	-----	4
1. Hematoxylin-eosine	-----	4
2.	-----	5
3. Hematoxylin-eosine	-----	6
B.	-----	6
.	-----	7
.	-----	8
	-----	12
	-----	16
	-----	19

----- 20

Fig 1. Herniated disc tissue stained with positive immunoexpression with
MMP-1 (x400) ----- 22

Fig 2. Herniated disc tissue stained with positive immunoexpression with
MMP-1 (x1000) -----23

Fig 3. Herniated tissue showing granulation tissue with MMP-2 (x100) -
----- 24

MMPs	: Matrix Metalloproteinase
MMP-1	: Matrix Metalloproteinase-1
MMP-2	: Matrix Metalloproteinase-2
MMP-3	: Matrix Metalloproteinase-3
H-E	: Hematoxylin-eosine
PBS	: Phosphate Buffered Saline
AEC	: 3 Amino-9-Ethyl-Carbazone

Matrix Metalloproteinase-1

Matrix Metalloproteinase-2

I.

(cytokine)
matrix metalloproteinase(MMP) . MMP
가 , MMP
29 .
MMP 20 가 가 , MMP-1,
MMP-2 MMP-3 가
. MMP-1 interstitial collagenase
, 가

²⁹. MMP-2 4

²³.

MMP-1 MMP-2

MMP 가

가

II.

가

68

enbloc

-70

Hematoxylin-eosine

MMP-1

MMP-2

MMP-1

MMP-2

III.

1 ()
pituitary forcep ,
-70

15

A.

Hematoxylin-eosine MMP-1 MMP-2

1. Hematoxylin-eosine

70

Bouin

30

40

Formalin

Xylene

(6±2

µm)

4% neutral buffered solution

(6±2 µm) Hematoxylin-eosine

(Fig 1).

2.

30

60

56

- 60

가

60

Xylene

10

3

peroxidase

3%

(H₂O₂)

Methanol

10

15

3

Phosphate

buffered solution(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 - Eosine

MMP-1 MMP-2 (MMP-1 and MMP-2 antibody, Dikopatt, Copenhagen, Denmark) 1:100 MMP-1
 MMP-2 (Fig 2, 3).

3. Hematoxylin-eosine

Hematoxylin-eosine MMP-1 MMP-2
 ,
 .
 . 2
 가 , MMP-1
 MMP-2 3
 가 .
 .

B.

MMP-1 MMP-2 .
 MMP-1 MMP-2
 .
 Chi-square test p 0.05
 가 .

IV.

36 32 ,
17 67 36.9 .
16 , 12 , 12 , 10
, 8 , 10 (Table 1).
20, 30 가 (Table 1).
MMP-1 MMP-2 (p=0.691)(Table 2).
MMP-1 MMP-2
MMP-1(50%) MMP-2(18.2%) (Table 3),
MMP-1 MMP-2 (p=0.815)(Table 3).

V.

(proteoglycan) 가 ,
(dry weight) 65%가 , 20%가
6, 7 .
가 , 3
60%가 Collagen, 20%가
6, 7 .

Matrix Metalloproteinase(MMPs) 4
proteinase(serine, cystein, aspartic, metallo) 12 .
MMPs 18 20 . MMPs 4
5 . MMP-1 Collagenase 1, interstitial Collagenase,
fibroblast Collagenase , (I, II, III, VII, VIII, X)
21 . MMP-2 72-kd Gelatinase A 72-kd type IV Gelatinase ,
(IV, V, VII, X, XZ), fibronectin, elastin, 21 .
MMPs MMPs

가 .

, MMPs 가 . MMPs
(Cytokines), (growth factor),

¹². MMP-1

. MMP-2 ,

8, 16 .

MMPs , MMP-1

15, 19

17

. MMP-1 2

(Proteoglycan aggrecan)

²⁹. MMP-1 I, II,

III, X

²⁸, MMP-1

MMP-1 ,

²⁹ . ,

²⁹ .

MMP-1

가

11, 23 .

가 ,

MMP-1

가

²⁹ .

MMP-1

가

²⁹.

,

가

²⁹.

proteinase 가

가

.

MMP-1 가

proteinase

가

²⁹.

,

가

^{21,29}

가

MMP-1

,

MMP-1

.

MMP-1

,

^{21, 29}.

Matrix Metalloproteinase-2(MMP-2)

72-KDa gelatinase

72-K-Da type IV

collagenase

,

MMP-2

in vivo

(substrate specificity)

,

gelatin,

4, 5

7

^{17, 18}. MMP-2

(cell surface mode of activation) 가

MMP-2

(barrier)

1, 4, 10, 13, 22, 24, 25, 26 . MMP-2

, Brown ² MMP-2

pregelatinase

membrane-associated

activator

. MMP-2 membrane-

associated specific activator

concanavalin A, cytochalasin D, phorbol esters, TGE-

3, 19, 27 .

MMP-2

MMP-2

가

MMP-2

(embryonic development),

(trophoblast)

(invation),

(angiogenesis), T

(transmigration)

1, 4, 10, 13, 22, 24, 25, 26 ,

. MMP-2

MMP-2

가 가

가

MMP-2,

가

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Table 1. Sex and age distribution according to the type of disc herniation.

	Protrusion		Extrusion		Sequestration	
	M	F	M	F	M	F
< 20	3	1	1			
21 – 30	4	3	3	4	2	3
31 – 40	4	2	3	3	3	4
41 – 50	2	2	2	1	2	2
51 – 60	2	3	1	2	1	1
61 <	1	1	2			
	16	12	12	10	8	10

Table 2. Results of afa stings with sex and age distribution.

	MMP-1		MMP-2*	
	M	F	M	F
< 20	2		2	
21 – 30	6	5	1	3
31 – 40	5	6	2	1
41 – 50	3	2	1	2
51 – 60	2	3		
60 <	2			

P>0.05, P*>0.05

Table 3. Results of immuoexpression of MMP-1 and MMP-2.

	MMP-1		MMP-2*	
	M	F	M	F
Protrusion	10	6	3	2
Extrusion	6	5	2	2
Sequestration	4	5	1	2

P>0.05, P*>0.05

Legend of figures

Fig. 1. Herniated disc tissue stained with positive immunoexpression with MMP-1. (x400)

Fig. 2. Herniated disc tissue stained with positive immunoexpression with MMP-1. (x1000)

Fig. 3. Herniated tissues showing granulation tissue with MMP-2. (x100)

-Abstracts-

**The study for the correlation between the expression of matrix
matalloproteinase-1 and matrix matallproteinase-2
in the herniated disc tissue**

Yong Ho Kang

Department of Medical Sciences

The Graduate School, Ajou University

(Directed by Professor Chang Hoon Jeon)

The matrix metalloproteinase(MMPs) are known to probably play a role in the degradation of extracellular matrix and in the degeneration of the intervertebral disc.

Many MMPs were observed in the herniated disc tissues, and especially observed to be associated with macrophage, fibroblast and granulation tissues. There was report that MMPs was well expressed abundant around cells in granulation tissue in the unclears pulposus and anulus fibrosus.

MMP-1 is known to be associated with type I, II, III, X collagen and MMP-2

to be associated with blood vessel formation in the herniated disc tissue.

The purposes of the study is to invertigate the correlation of difference between the expression of MMP-1 and MMP-2 according to the sex, age distribution, and the type of disc herniation.

In Hematoxylin-eosin stain, monocytes and inflammation were observed and the immunoexpression of MMP-1 and MMP-2 was observed in the herniated disc tissues.

As the results of study, there was no correlation between the expression of MMP-1 and MMP-2 and the sex, age distribution and type of disc herniation, and MMP-1 was mainly observed in the herniated disc tissues. The expression of MMP-1 has been no statistical significance an there is necessary to study for the association between the blood vessel formation and other angiogenetic factors, because of a few expression of MMP-2.

Key words : Hernation of intervertebral disk, Matrix metallopreteinase-1,

Matrix metallopreteinase-2

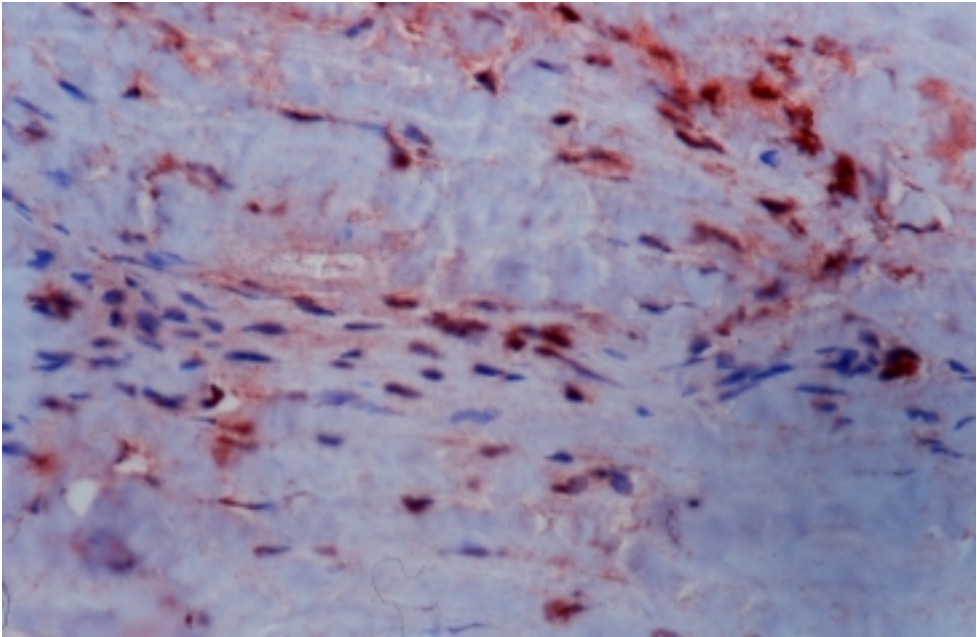


Fig. 1. Herniated disc tissue stained with positive immunoeexpression with
MMP-1. (x400)

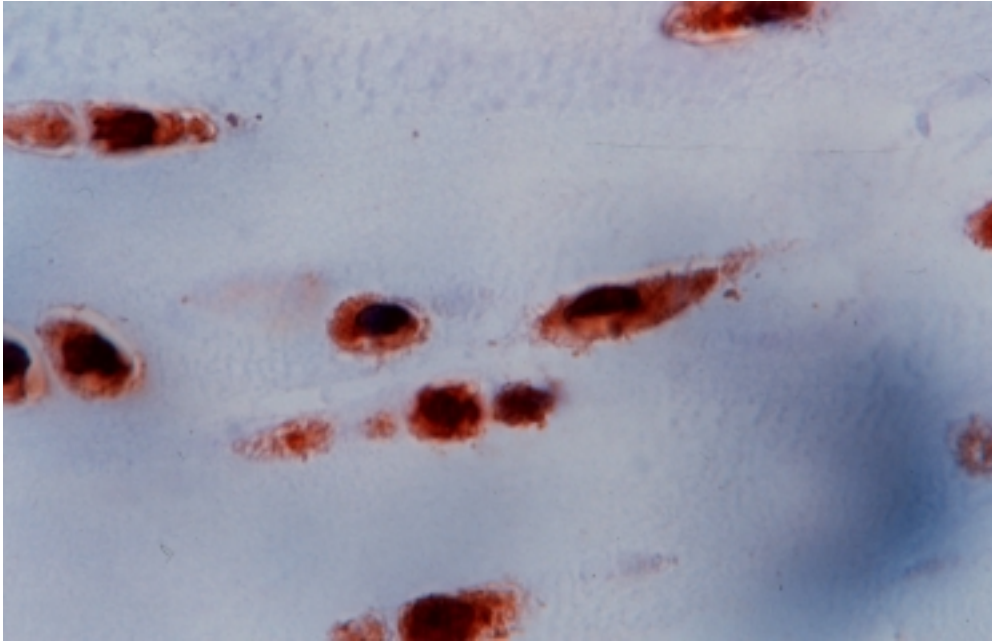


Fig. 2. Herniated disc tissue stained with positive immunoexpression with MMP-1. (x1000)

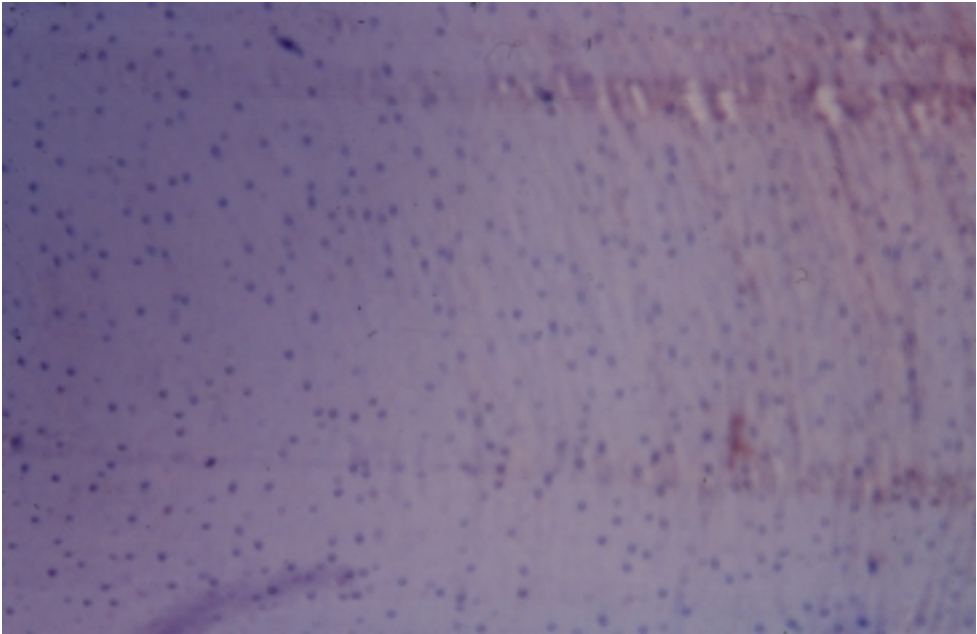


Fig 3. Herniated tissues showing granulation tissue with MMP-2. (x100)