PLAN

G. Lamirault

GÉNERALITES (1,2)

COMPOSANTS

- Polysaccharides
  - Glycosaminoglycanes (3,4,5)
  - Protéoglycanes (6, 7, 8 , 9, 10)
- Protéines fibreuses structurales
  - Collagène(s)
    - Généralités (11,12)
    - Collagène fibrillaire (13,14,15,16,17)
    - Collagène en réseaux (18)
    - Synthèse (19)
  - Fibres élastiques de la matrice (20,21,22)
- Glycoprotéines adhérentes
  - Fibronectine (23,24,25)
  - Laminine (26,27)
  - Famille des tenascines (28,29)

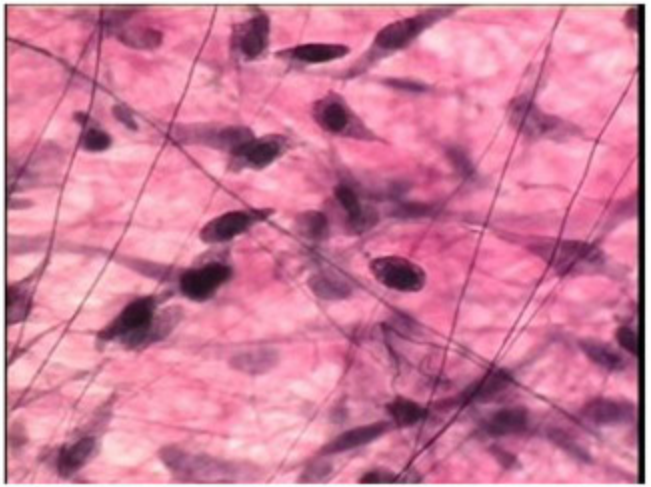
ORGANISATION DE LA MATRICE EXTRACELLULAIRE

- Intégration des différents composants (30,31,32,33)
- Aspects dynamiques de la matrice (34,35,36,37)

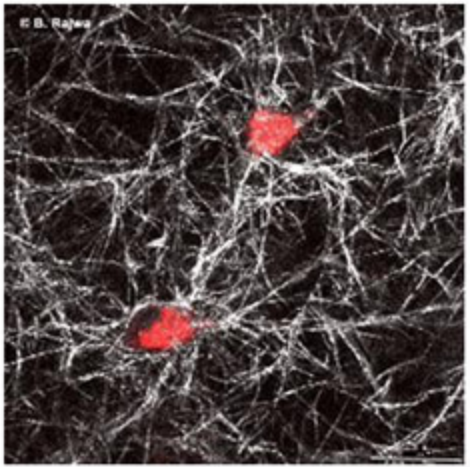
IMPLICATION EN PATHOLOGIE

- Rupture de l'équilibre synthèse-dégradation (38,39)
- Pathologies acquises (40)
- Pathologies héréditaires (41,42,43,44)
- Applications thérapeutiques (45)

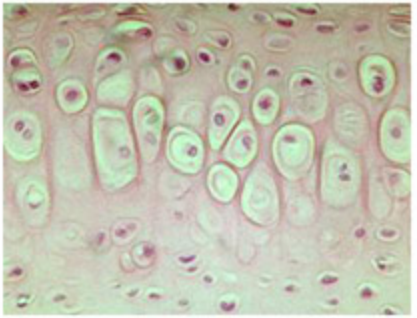
Généralités



www.mhhe.com/

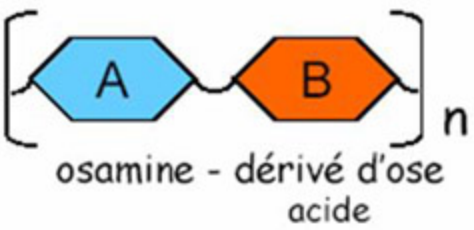


helios.mol.uj.edu.pl/

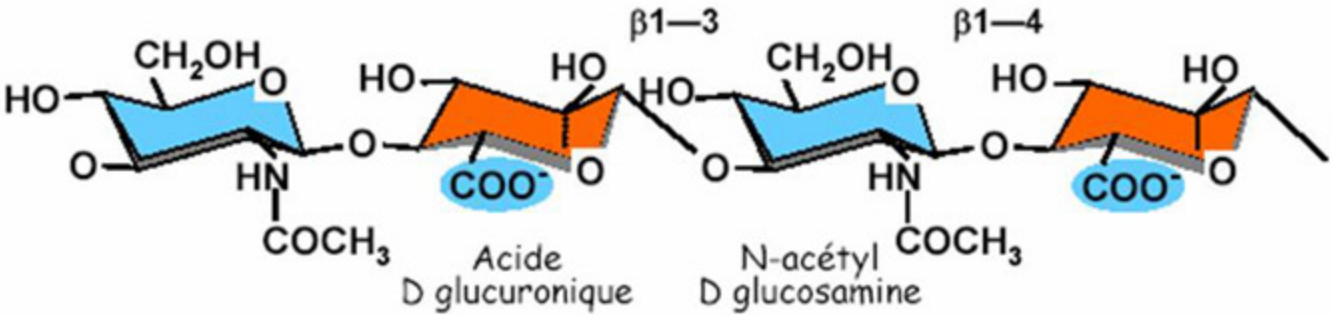


meded.ucsd.edu/

Glycosaminoglycanes



Acide hyaluronique



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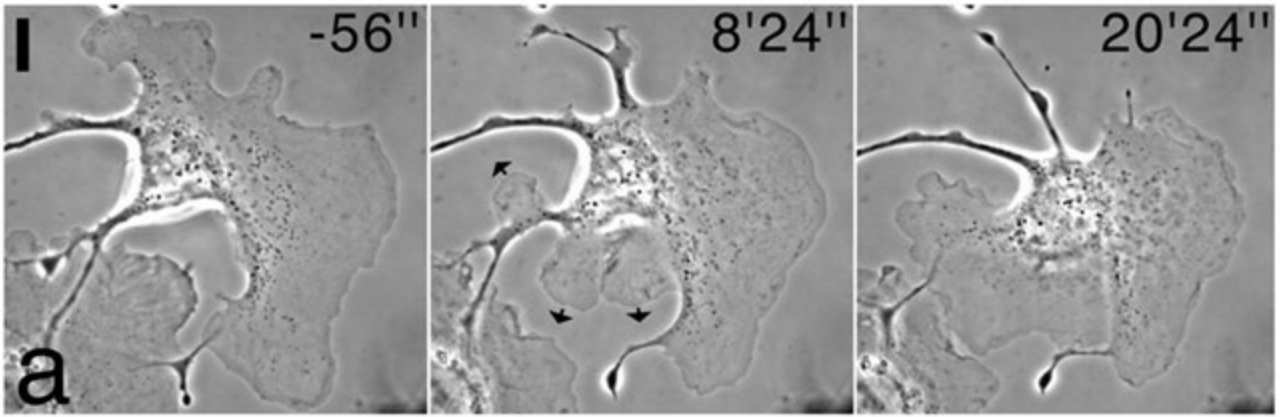
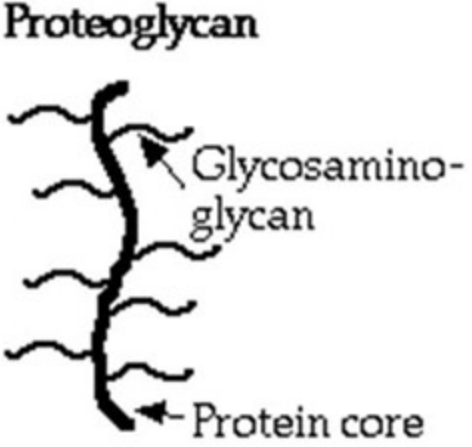
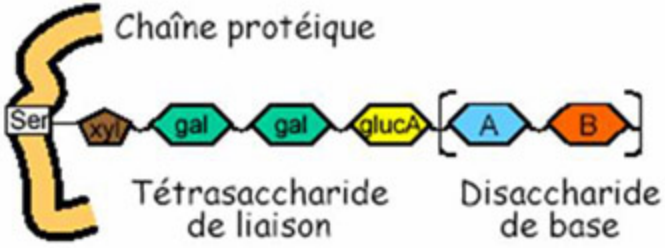


Protéoglycanes



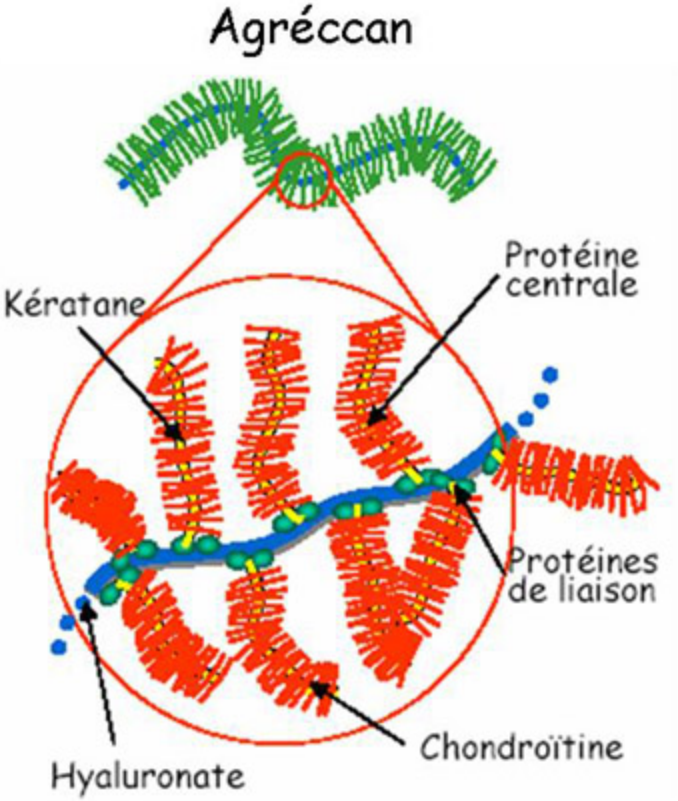
Protéoglycanes

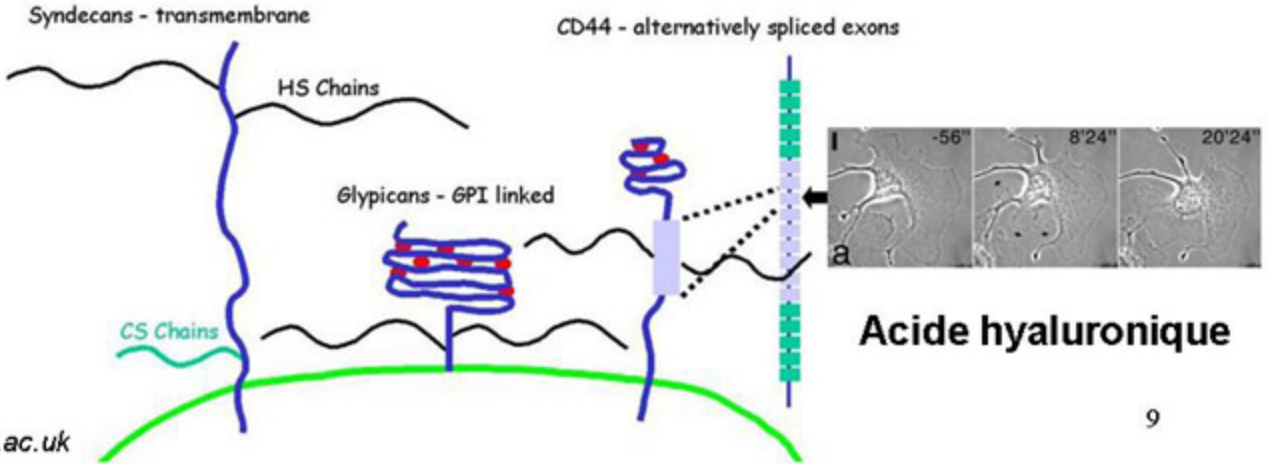


	Masse moléculaire	Type de GAG	Nbre de GAG	Localisation	Fonction
Aggrécan	210 000	C S + K S	> 100	cartilage	support mécanique
Bétaglycane	36 000	C S / D S	1	MEC, memb	lie TGF
Décorine	40 000	C S / D S	1	MEC	lie collagène
Perlécan	600 000	H S	2 - 15	lame basale	structure filtration

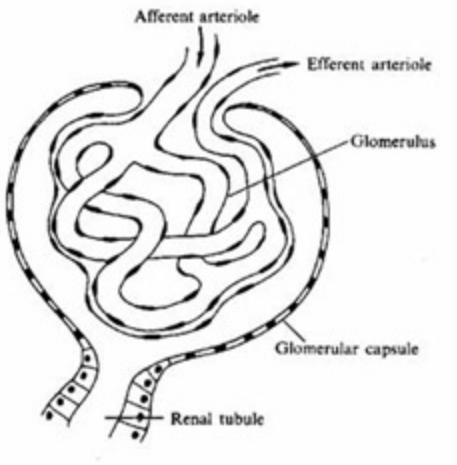
Assemblages en complexes macromoléculaires

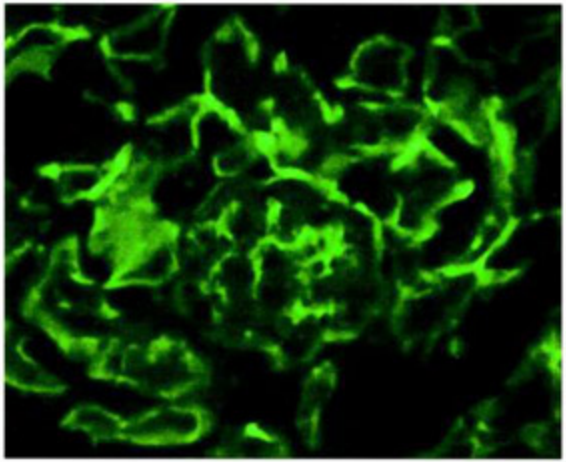
Suite



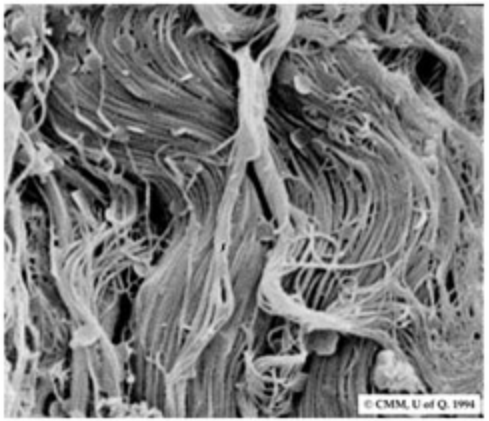


Acide hyaluronique


Afferent arteriole
Efferent arteriole
Glomerulus
Glomerular capsule
Renal tubule



Collagène(s)



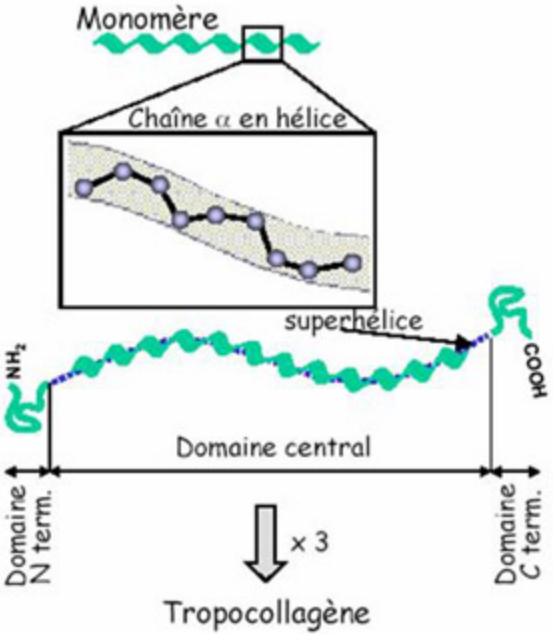
www.wellesley.edu

www.imagecontent.com

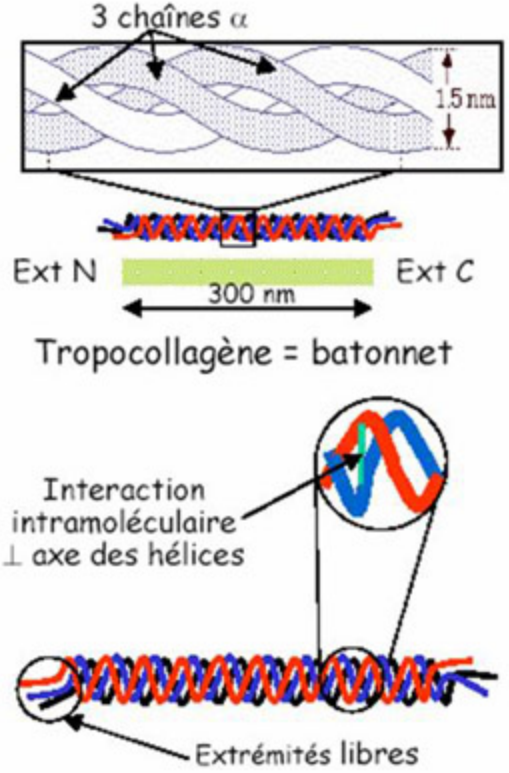
Différents types de collagène

Forme	Type	Localisation	Fonction
Fibrillaire	I	Tout l'organisme sauf cartilage	Résistance à l'étirement
	II	Cartilage, Disques intervertébraux	
	III	Vaisseaux	
	V	Copolymérise avec collagène I	
	XI	Copolymérise avec collagène II	
Réseau	IV	Lame Basale	Support
	VIII	Vaisseaux (endothélium) , cornée	
	X	Cartilage	
Associé aux fibrilles	VI	Vaisseaux (intima)	Liaisons entre molécules
	IX	Cartilage	
	XII	Tendons, ligaments	
	XIV	Peau, tendons	
Trans membranaire	XIII	Cœur, vaisseaux	Liaisons à la cellule
	XVIII	Rétine, iris	

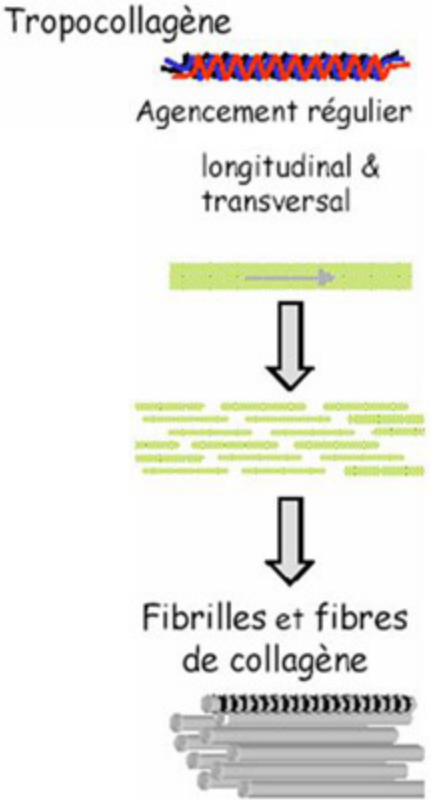
Structure de la chaîne alpha de collagène (ex: collagène I)



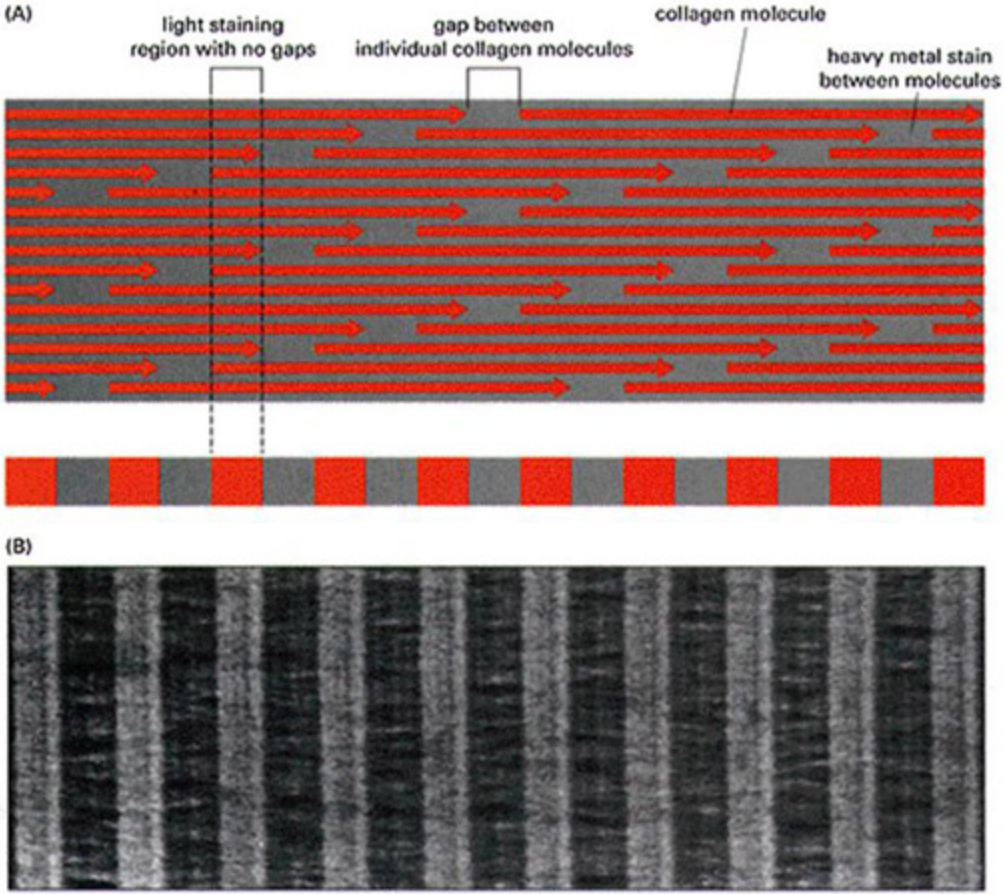
Structure du tropocollagène



Structure des fibrilles de collagène I



Explication de la périodicité observée en ME



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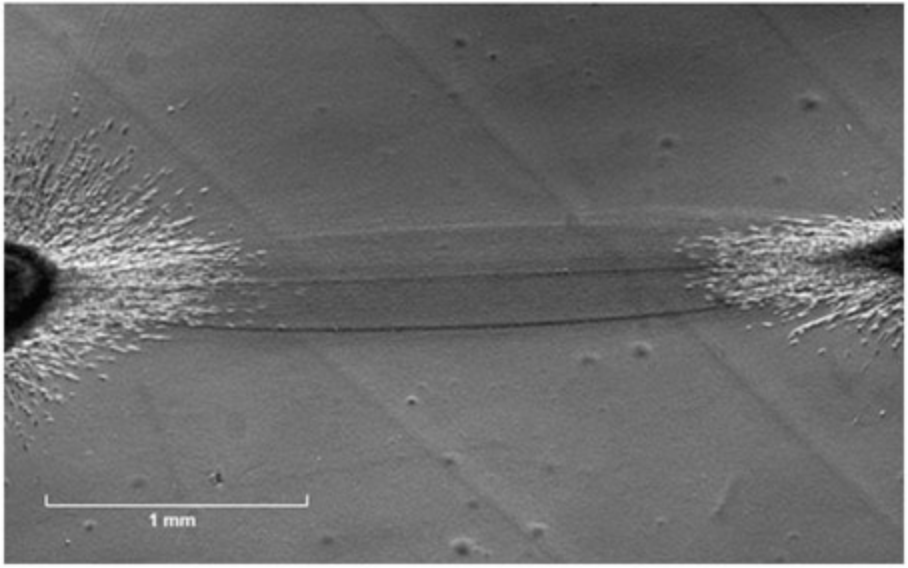

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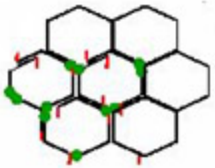
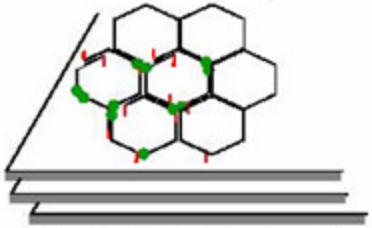
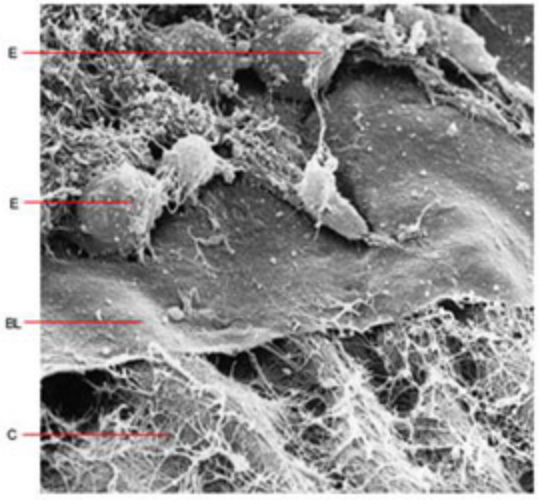
Collagène IV en réseau







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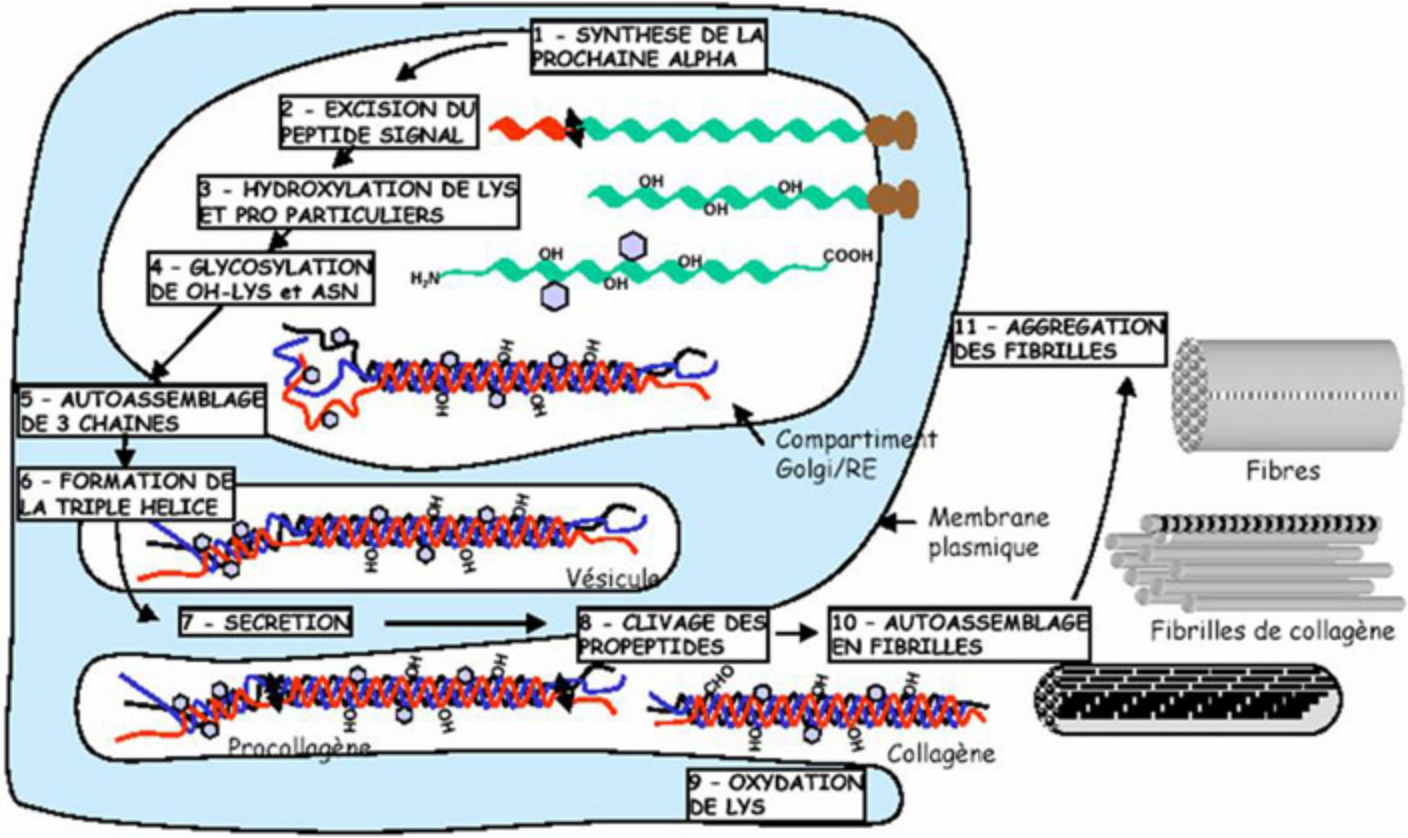
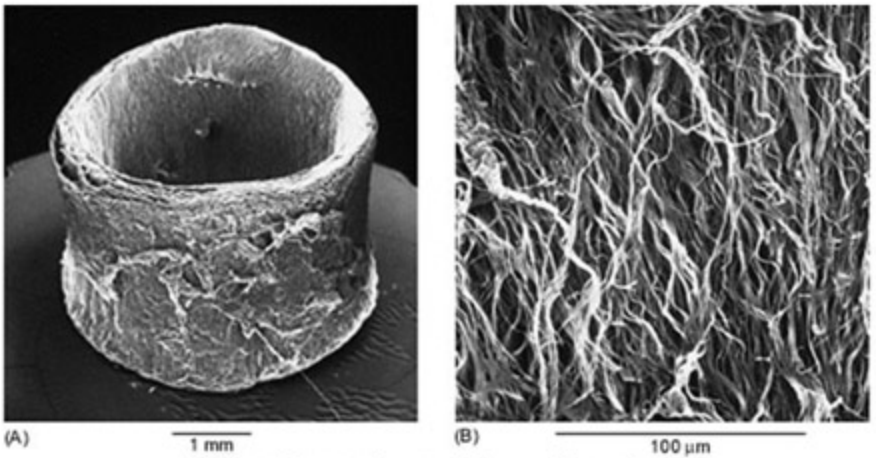
Synthèse du collagène



Fibres élastiques de la matrice



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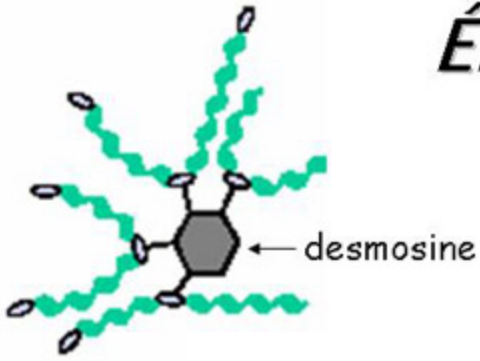
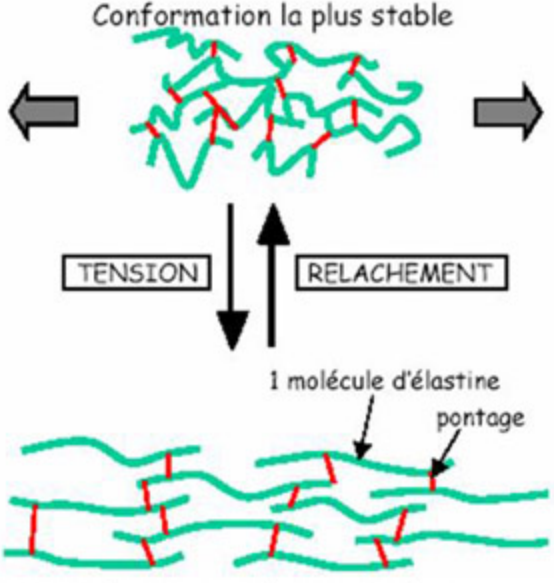
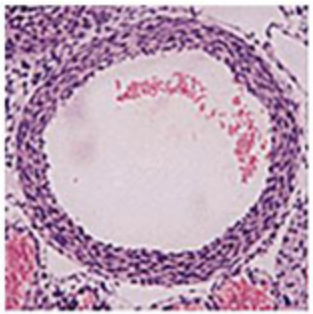
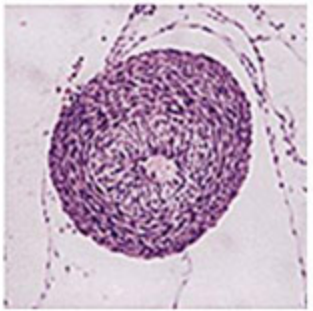
Élastine



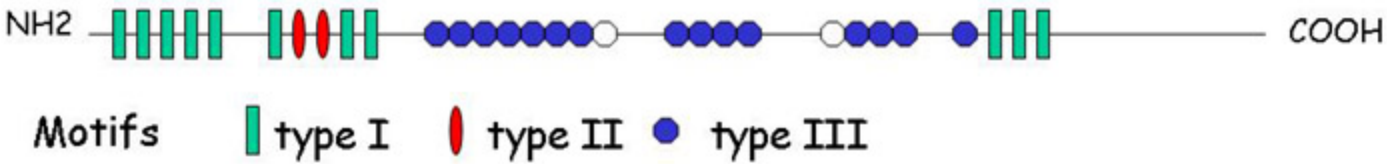
liaison de 4 chaînes d'élastine



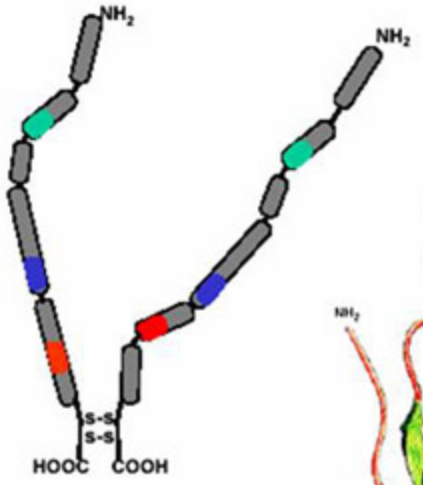




Fibronectine



Fibronectine tissulaire



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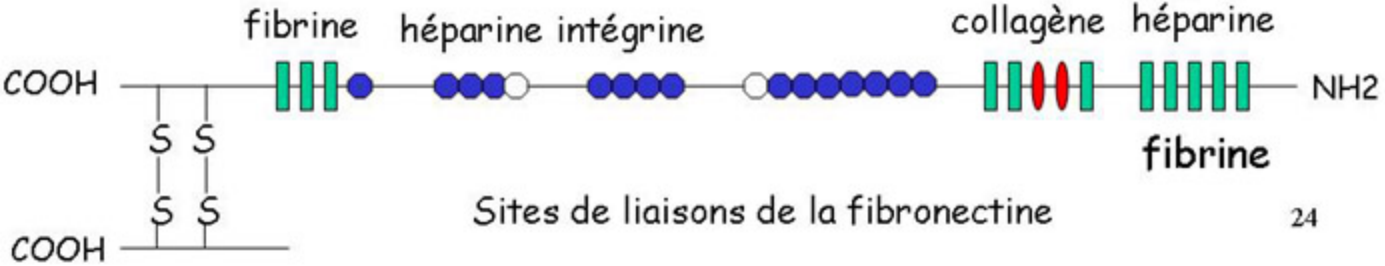
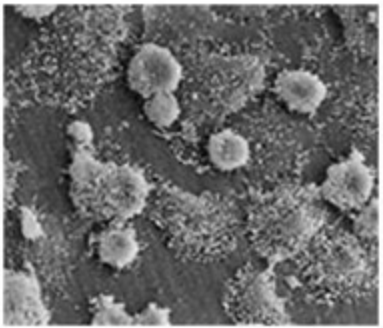
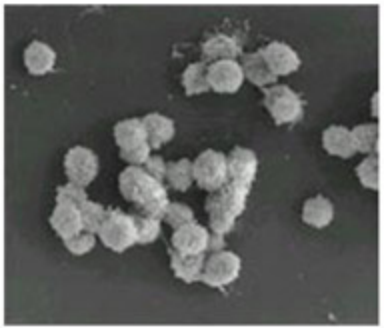


Sites de liaisons de la fibronectine





Laminine

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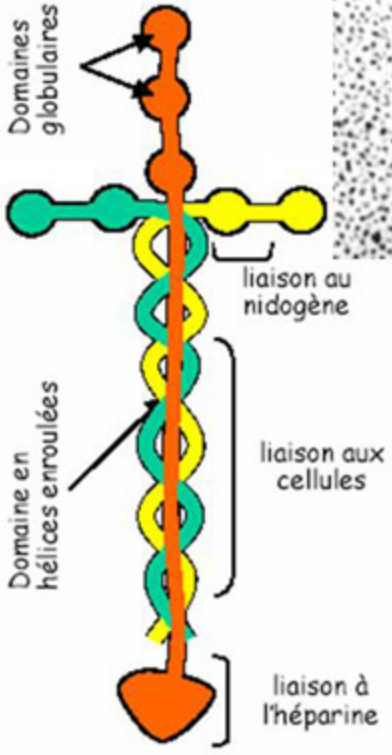
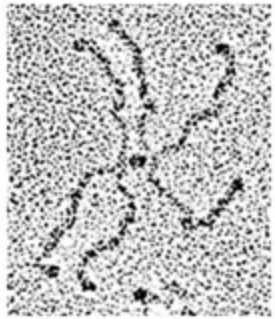


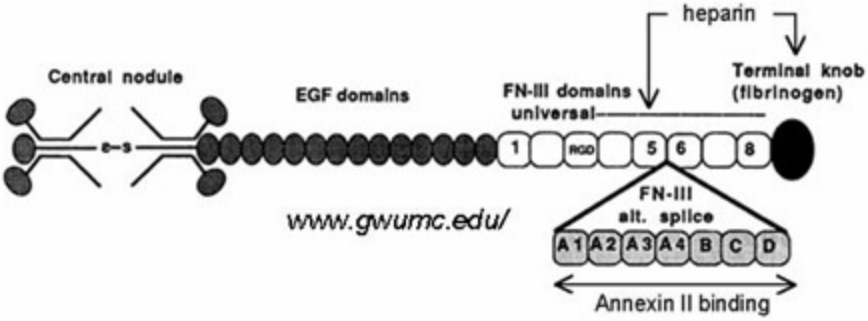
Suite

bms.brown.edu/

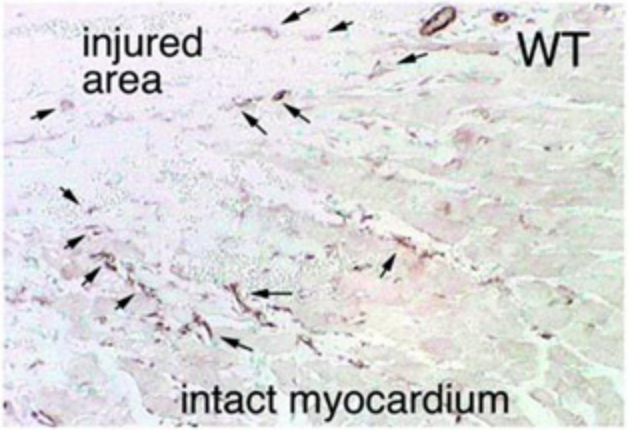
Famille des tenascines

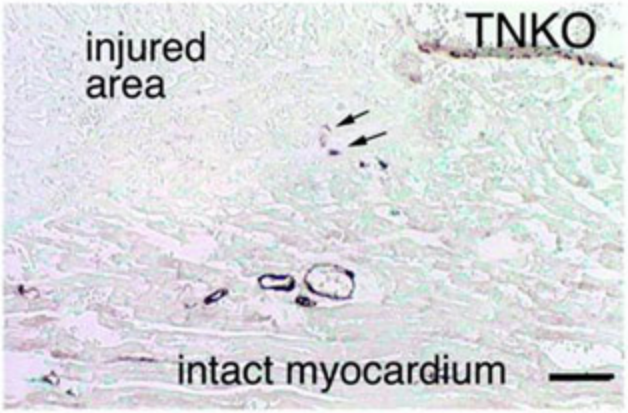


www.cellbio.duke.edu/



www.gwumc.edu/

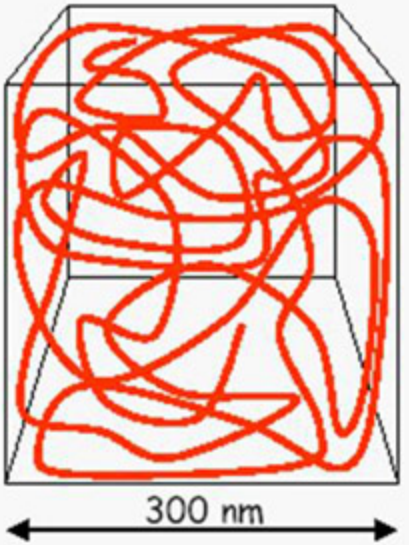

injured
area
WT
intact myocardium


injured
area
TNKO
intact myocardium

Encombrement des molécules

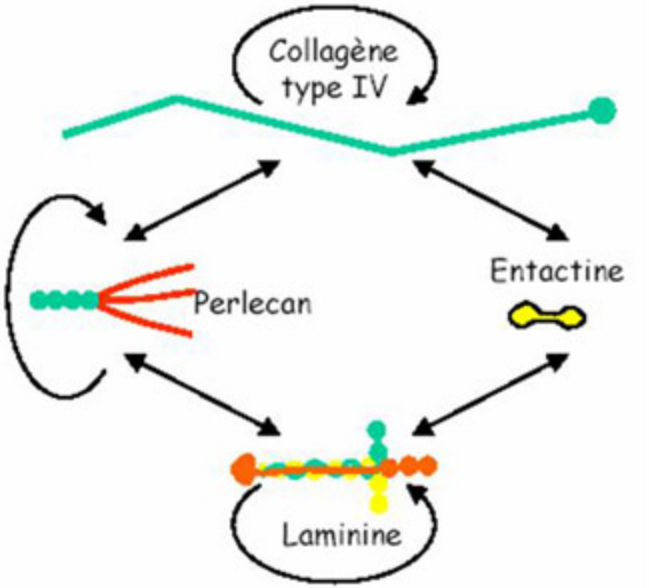
Protéine globulaire (MW 50 kDa)

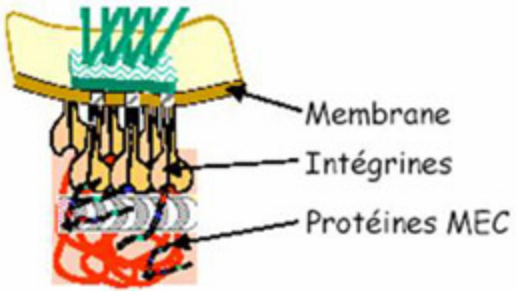
Collagène (MW 300 kDa)



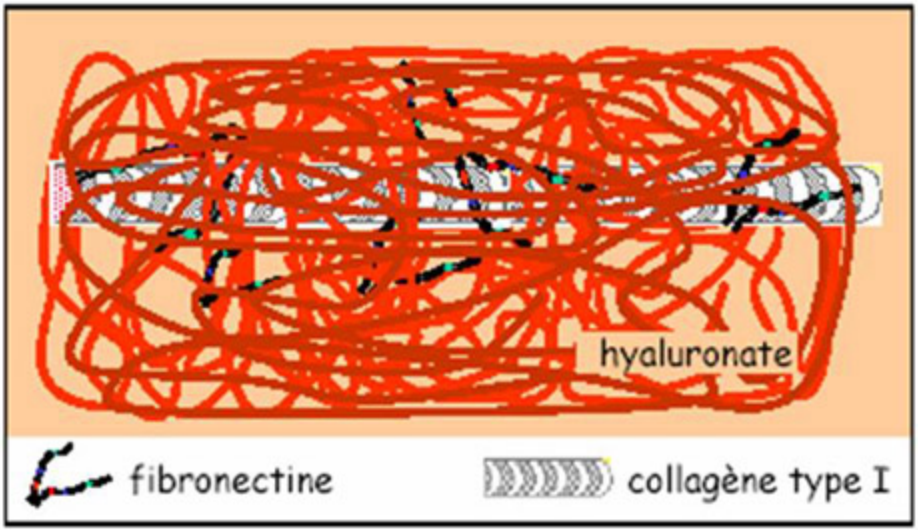
Hyaluronate (MW 8000 kDa)

Interactions multiples

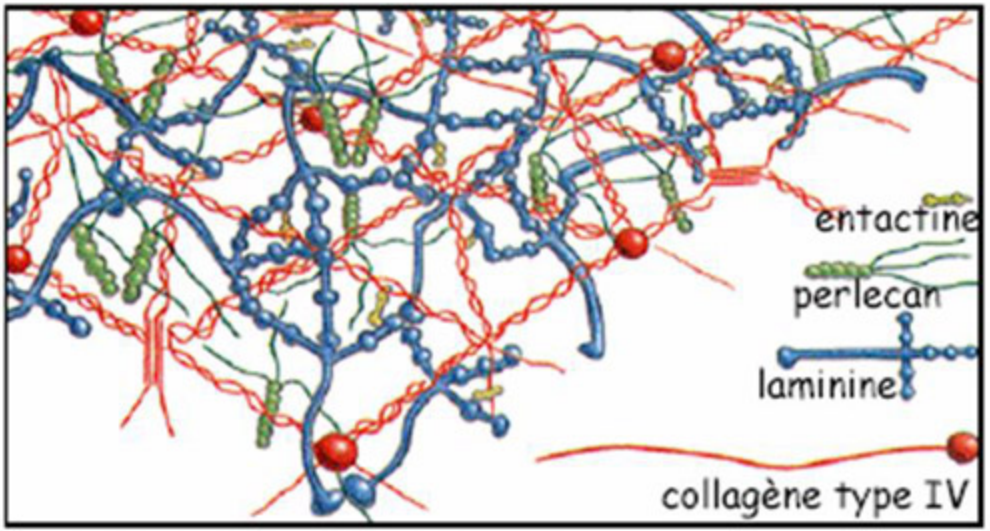




Organisation générale de la matrice extracellulaire du tissu conjonctif lâche



Organisation générale de la matrice extracellulaire de lame basale



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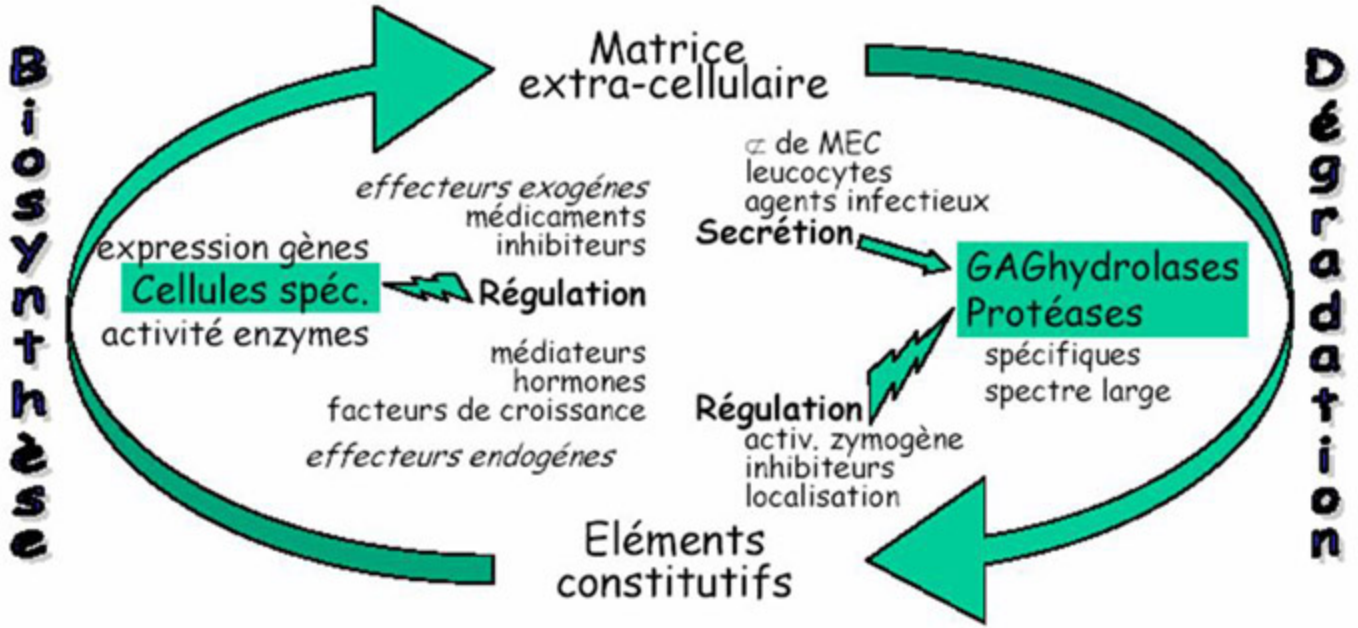
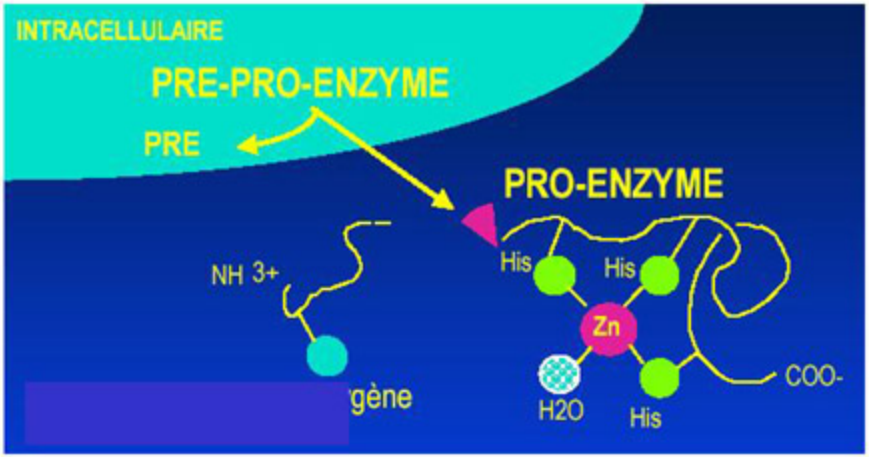
Aspects dynamiques de la matrice extracellulaire

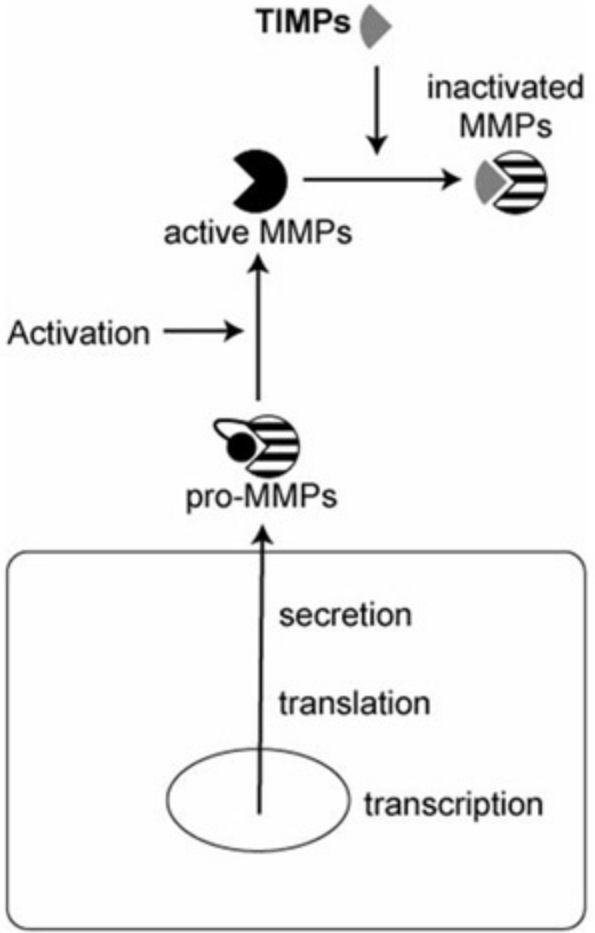


Métalloprotéases de la matrice (MMP)



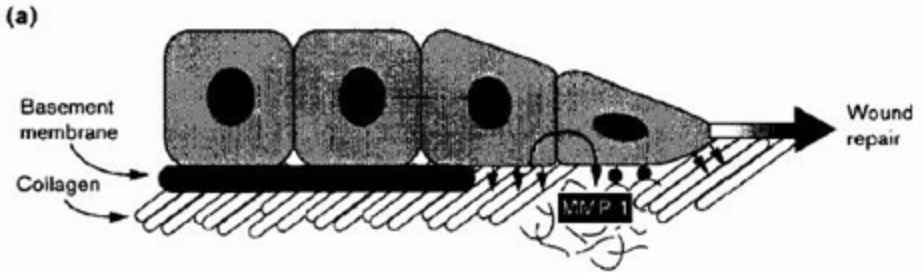
Régulation de l'activité des MMP

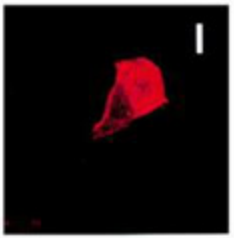
Suite



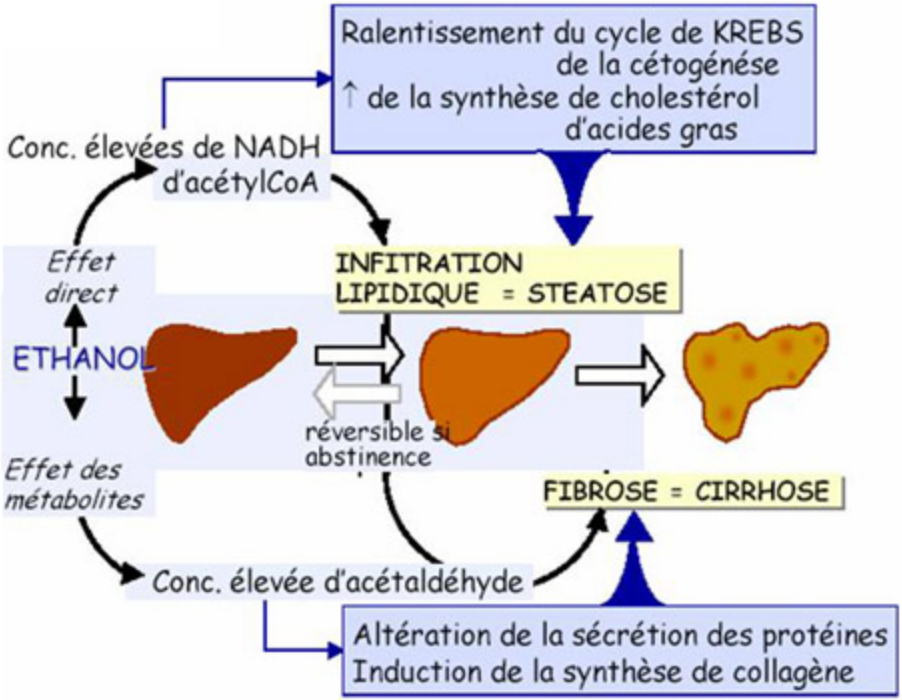
Rôles des MMP

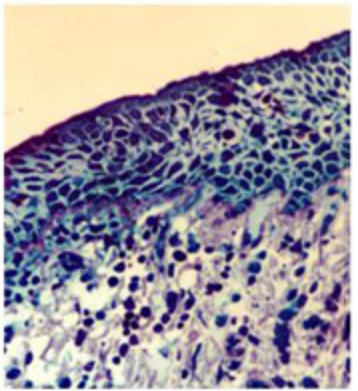
Suite





Rupture de l'équilibre synthèse – dégradation





www.akronchildrens.org/

Pathologies Acquises

la bouche devenait si « infecte et pourrie par les gencives que toute la chair en tombait, jusqu'à la racine des dents lesquelles tombaient presque toutes...»

www.grics.qc.ca/

www.derweb.co.uk/

Pathologies héréditaires

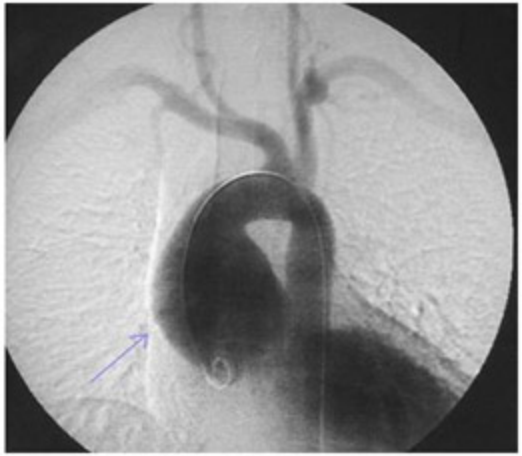
www.mdmultimedia.com/

padeh.net/

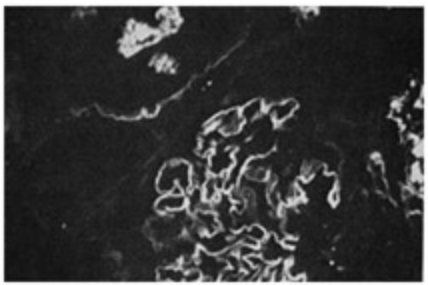
Maladie	Trouble du collagène	Symptômes
Ehlers-Danlos IV	Diminution coll. III	Ruptures artérielles, intestinales et utérine, peau fine
Ehlers-Danlos V	Diminution des liaisons croisées	Peau et articulations hyperextensibles
Ehlers-Danlos VI	Diminution OHLys	Cicatrisation déficiente, déformations musculaires et squelettiques, peau et articulations hyperextensibles
Ehlers-Danlos VII	Pas d'hydrolyse du propeptide N term.	peau fine, luxations, hyperlaxité
Oseteogenesis imperfecta	Diminution coll. I	Déformations osseuses

Suite

www.hughston.com/



sprojects.mmi.mcgill.ca/



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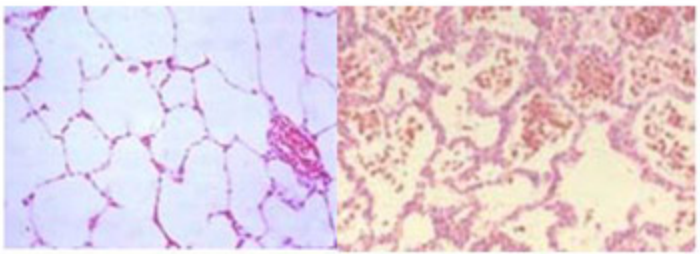

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Applications thérapeutiques

Collagène

collagène = biomatériau

Avantages	Inconvénients
Abondant et facile à isoler Non antigénique Biodégradable Non toxique et biocompatible Synergie avec éléments MEC Chimiquement modifiable	Onéreux (type I pur) Variabilité (collagènes associés) Variabilité de la résistance à l'hydrolyse enzymatique Vecteur possible de l'ESB