



1-2 February 2010  
KORANET PARTNERING EVENT

*Research for life-long health*

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MSE, Gwangju Inst. of Sci. & Tech.  
Scaffold Design, Elastic Polymers, and  
Growth Factor Delivery System  
for Connective Tissue Regeneration



**Gwangju Inst. of Sci.&Tech.(GIST)**

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- Special Graduate School for Research & Education Institute Funded by Korean Government since 1995.
- Five Depts: Mat.Sci. & Eng., Info. & Commun., Mechatronics, Env. Sci & Eng., Life Science
- ~ 100 Faculty, ~400 MS & ~500 PhD Students
- Paper No./Faculty : 1<sup>st</sup> in Korea for 12 yrs
- Citation No. /Faculty: 1<sup>st</sup> in Asia (14<sup>th</sup> in world: Survey by The Times & QS)
- Patent Holding & Application No./Faculty: 1<sup>st</sup> in Korea
- Prof. Tae: 33 SCI papers & 8 patents (regist.) since 2007

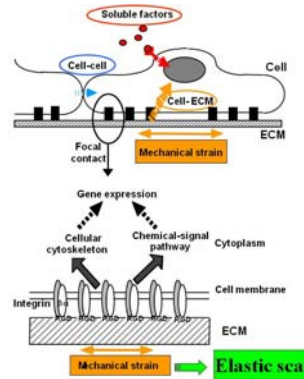




# PROJECT IDEA

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- Tissue regeneration:



- Mechanical stimuli for connective tissues using a very elastic scaffold
- Proper delivery of GFs (sustained & bioactive form) and cells using heparin-functionalized hydrogel & nanoparticles



# EXPERTISE (1) Elastic biodegradable polymers

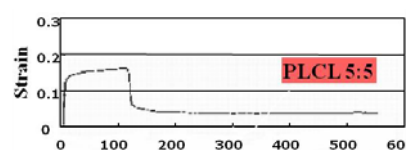
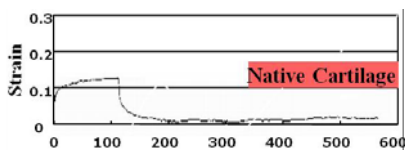
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- PLCL [poly(lactide-co-caprolactone)]



- Mechanical stimulus for tissue regeneration

Recovery after compression:  
PLCL = native cartilage  
Ideal for cyclic compression load



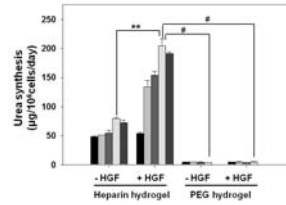
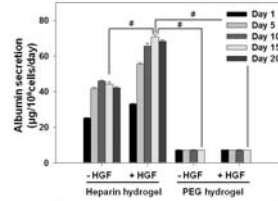
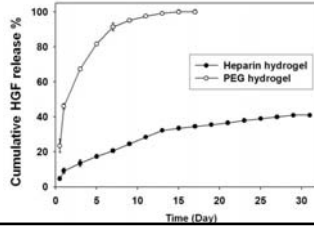
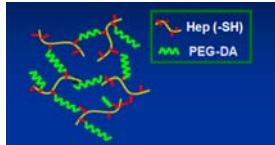


## EXPERTISE (2)

### Cell & Growth Factor Delivery Hydrogel

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- Heparin-based hydrogel
- In situ forming: high cell delivery efficiency
- Local & sustained delivery of loaded GFs in bioactive forms
- e.g.: Hepatocyte culture with HGF



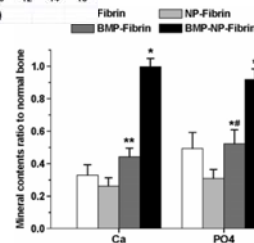
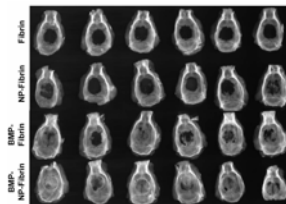
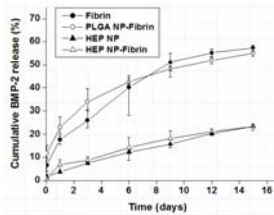
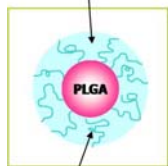
## EXPERTISE (3)

### Growth Factor Delivery Nanoparticles

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- Heparin-functionalized nanoparticles +Fibrin
- Local & sustained delivery of GFs in bioactive forms
- e.g.: Bone graft with BMP-2

Hydrophilic surface layer (Pluronic)





## PARTNER SOUGHT

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- Design of novel nano-, micro-, and macro-scale scaffolds for tissue engineering, capable of modifying mechanical (mechano-transduction) and chemical signalling to control cell interactions, proliferation and differentiation
- Implementation of modelling, imaging and rapid prototyping technology to design custom-made structures for tissue repair and regeneration
- Other areas that can utilize growth factor delivery, biofunctional hydrogel micropattern, and highly elastic biodegradable polymers.



## CONTACT DETAILS

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