THE HONG KONG POLYTECHNIC UNIVERSITY 香港理工大學
FACULTY OF ENGINEERING 工程學院
WHERE CONCEPTS BECOME REALITY
Interdisciplinary Division of Biomedical Engineering 生物醫學工程跨領域學部

Search for novel senolytic drugs for rescue of osteoarthritis

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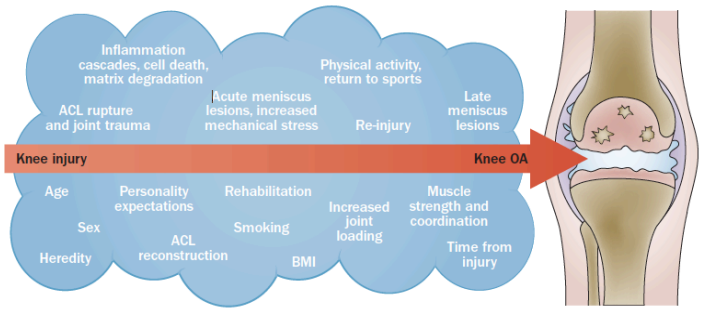
Challenge: Sharp growth of aged population calls for a rethink how our healthcare should be delivered for age-related pathologies, including osteoarthritis, a leading cause of pain and disability in older adults.

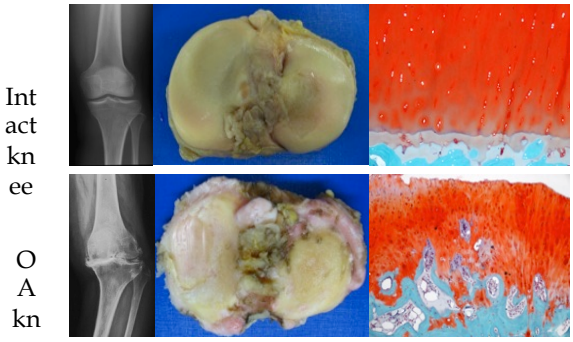
Mission: Early diagnosis and intervention of OA to promote active ageing

The etiology of knee OA is multifactorial



Wen C, Lohmander LS. Nat Rev Rheumatol. 2014 Oct;10(10):577-8.

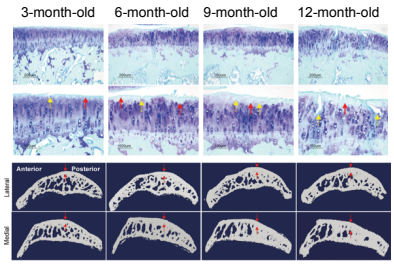
"Osteo"arthritis: A Bone Problem?



Wen C et al. JOT, 2014 Jan 2(1) 16-25.

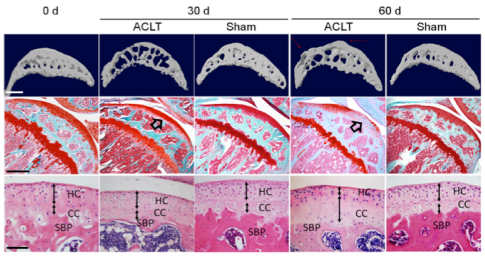
Research & Development Platform:

Spontaneous OA model



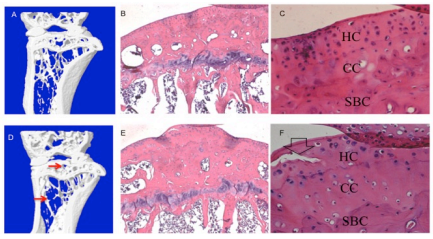
Wang T, et al., Osteoarthritis Cartilage. 2013 Apr;21(4):574-81.
Zhao W et al., J Orthop Res. 2015 Oct 23.

Surgery-induced OA model



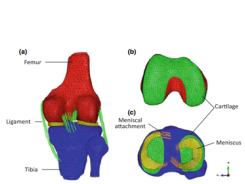
Zhen G, **Wen C**, et al. Nat Med. 2014 Oct;10(10):577-8.

Transgenic OA model



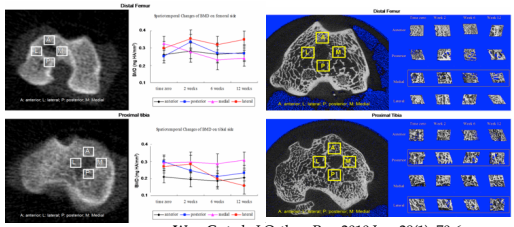
Wen C, et al. Life Sci. 2014

Multi-imaging modalities: VivaCT40 (Scanco, CAF, 14/F Y Block); Vevo LAZR 2100 system (VisualSonic, Y505)



Yao J, **Wen C**, et al., Ann Biomed Eng. 2012 Jul;40(7):1554-67.

Zhen G, **Wen C**, et al. Nat Med. 2014 Oct;10(10):577-8.



Wen C et al., J Orthop Res 2010 Jan; 28(1): 70-6.

Patent:

- Chondroitin sulfate Strontium and its preparation method (CN 104788586 A)

Patent:

PI for Health and Medical Research Fund - Research Fellowship Scheme "Photoacoustic Molecular Imaging of Osteoarthritic Pain – a Proof-of-concept Study" (#01150087)
Co-I for RGC General Research Fund Scheme - "Is endothelin-1 signaling a therapeutic target to rescue OA? An experimental study" (#7105314)

Publications

Osteoarthritis

(1) Huang YP, Zhong J, Chen J, Yan CH, Zheng YP, Wen CY. High frequency ultrasound imaging of tidemark in vitro in advanced knee osteoarthritis. **Ultrasound in Medicine and Biology** (accepted)

(2) Chan B, Wen CY. Spontaneous hypertensive rat exhibits bone and meniscus phenotypes of osteoarthritis: is it an appropriate control for MetS-associated OA? ***Annals of the Rheumatic Diseases*** 2017 Aug 10. pii: annrheumdis-2017-211995. doi: 10.1136/annrheumdis-2017-211995.

(3) Ma, F, Liu N, Hu N, Wen CY, Tang B. "Synthesis of strontium chondroitin sulfate and the evaluation of its capability to attenuate osteoarthritis". ***Carbohydrate Polymers***, 2017(170): 217-225.

(4) Zhao W, Wang T, Luo Q, Chen Y, Leung VY, **Wen C**, Shah MF, Pan H, Chiu K, Cao X, Lu WW. Cartilage degeneration and excessive subchondral bone formation in spontaneous osteoarthritis involves altered TGF-β signaling. ***J Orthop Res***. 2016 May;34(5):763-70.

(5) Sin A, Tang W, **Wen C**, Chung SK, Chiu KY. The emerging role of endothelin-1 in the pathogenesis of subchondral bone disturbance and osteoarthritis. ***Osteoarthritis & Cartilage*** 2015 Apr;23(4):516-24.

(6) **Wen, C**. & Lohmander, L. S. Does post-injury ACL reconstruction prevent future OA? ***Nat. Rev. Rheumatol***. 2014 Oct;10(10):577-8.

(7) Chan P, Zhu L, **Wen CY**, Chiu KY. Subchondral bone proteomics in osteoarthritis: Current status and perspectives. **Journal of Orthopaedic Translation** 2015: 3 (2), 71-77

(8) Tang B, Fong MK, **Wen CY**, Yan CH, Chan D, Ngan A, Chiu KY, Lu WW. Nanostiffness of Collagen Fibrils Extracted From Osteoarthritic Cartilage Characterized with AFM Nanoindentation. ***Soft Materials*** 2014 12(3) 253-261.

(9) **Wen CY**, Lu W, Chiu KY. Importance of subchondral bone in pathogenesis and management of osteoarthritis - from bed to bench. ***Journal of Orthopaedic Translation*** 2014 Jan 2(1) 16-25.

(10) **Wen C**, Chen Y, Tang HL, Yan CH, Lu WW, Chiu KY. Bone loss at subchondral plate in knee osteoarthritis patients with hypertension and type 2 diabetes mellitus. ***Osteoarthritis & Cartilage***. 2013 Nov; 21(11): 1716-23.

(11) Zhen GH, **Wen CY**, Jia XF, Li Y, Mears S, Askin F, Frassica F, Chang W, Crane J, Yao J, Nayfeh T, Johnson C, Artemov D, Cosgarea A, Carrino J, Wan M, Lu W and Cao X. Inhibition of TGFβ signaling in subchondral bone mesenchymal stem cells prevents onset of osteoarthritis. ***Nature Medicine*** 2013 Jun; 19(6): 704-12.

(12) Wang T, **Wen CY**, Yan CH, Lu WW, Chiu KY. Spatial and Temporal Changes of Subchondral Bone Proceeds to Articular Cartilage Degeneration in Guinea Pigs with Spontaneous Osteoarthritis. ***Osteoarthritis & Cartilage*** 2013 Apr; 21(4): 574-81.

(13) **Wen CY**, Wu CB, Tang B, Wang T, Yan CH, Lu WW, Pan H, Hu Y, Chiu KY. Collagen Fibril Stiffening in Osteoarthritic Cartilage of Human Beings Revealed by Atomic Force Microscopy. ***Osteoarthritis & Cartilage***. 2012 Aug; 20(8): 916-22.

Osteoporosis

(14) Liu ZY, Yang, Y, Wen CY, Rong LM "Serum Osteocalcin and Testosterone Concentrations in Adult Males with or without Primary Osteoporosis: A Meta-Analysis". ***BioMed Research International***, 2017 (in print)

(15) Qiu T, Xian L, Crane J, **Wen C**, Hilton M, Newman P, Lu W, Cao X. PTH receptor signaling in osteoblasts regulates endochondral vascularization in maintenance of postnatal growth plate. ***J Bone Miner Res***. 2015 Feb; 30 (2):309-17.

(16) Xian LL, Lou M, Wu XW, Yu B, Frank Frassica F, Wan M, Pang LJ, **Wen CY**, Tryggestad E, Wong J, Xu Cao X. Pretreatment with antioxidants prevent bone injury by improving bone marrow microenvironment for stem cells. ***Stem Cell Discovery*** 2012 July 2(3): 100-107.

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(19) Shen Y, Liu W, Lin K, Pan H, Darvell BW, Peng S, **Wen C**, Deng L, Lu WW, Chang J. Interfacial pH – a critical factor for osteoporotic bone regeneration. *Langmuir*, 2011, *27* (6), pp 2701–2708.

Tendon & Ligament Injury

(20) Yao J, **Wen CY**, Zhang M, Cheung JT, Yan C, Chiu KY, Lu WW, Fan Y. Effect of tibial drill-guide angle on the mechanical environment at bone tunnel aperture after anatomic single-bundle anterior cruciate ligament reconstruction. ***International Orthopaedics***. 2014 May; 38(5): 973-81.

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Spinal Cord injury

(28) **Wen CY**, Cui JL, Mak KC, Luk DK, Hu Y. Diffusion Tensor Imaging of Somatosensory Tract in Cervical Spondylotic Myelopathy and Its Link with Electrophysiological Evaluation. ***Spine J*** 2014 Aug 1;14(8):1493-500.

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