ACHILLES
ADVANCING TENDON REGENERATIVE THERAPIES

NEWSLETTER

JUNE 2022

ABOUT

Achilles: Overcoming specific weaknesses in tendon biology to design advanced regenerative therapies

The European Horizon2020 Twinning project Achilles reflects the weaknesses in specific areas of expertise that UMinho envisions to overcome through the twinning process in order to advance the field of Tissue Engineering to develop regenerative medicine therapies for tendon regeneration.

Achilles Partners

Achilles is coordinated by the 3B's Research Group of the University of Minho (UMINHO, Portugal), with the participation of The Regenerative, Modular & Developmental Engineering Laboratory (REMODEL) at National University of Ireland Galway and University College Dublin (NUIG-UCD, Ireland) and the Department of Trauma Surgery, University Regensburg Medical Centre / Department of Musculoskeletal Regeneration, Orthopaedic Hospital König-Ludwig-Haus, University of Würzburg (UHREG-JMU, Germany).

ACHILLES
ADVANCING TENDON REGENERATIVE THERAPIES

OUR EVENTS

Third Achilles Workshop – *Gene & Cell Therapy and Clinical Applications*

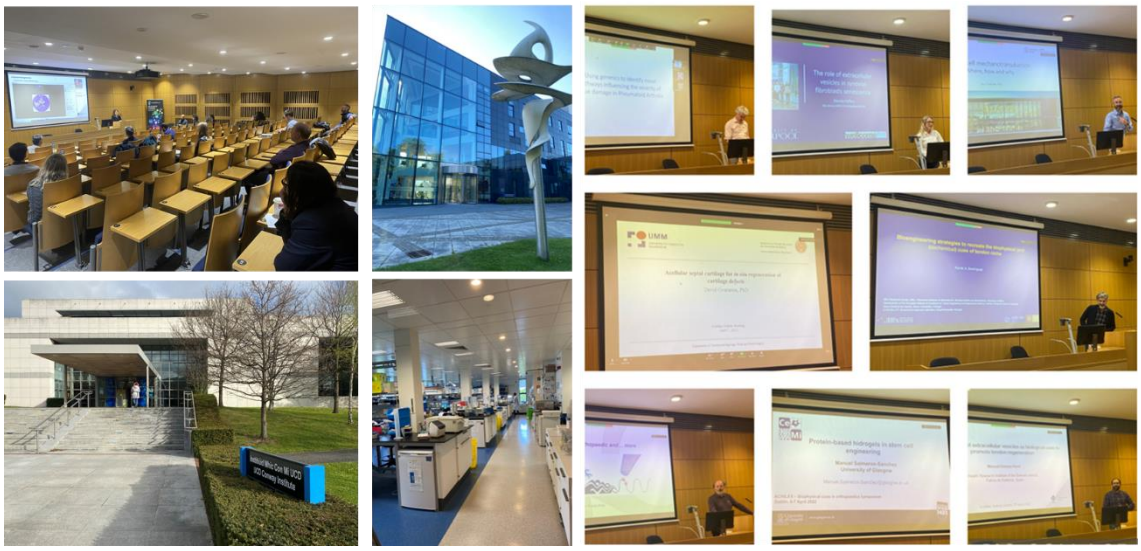
Fundação Cupertino de Miranda, Porto, Portugal, 25 – 27 October 2021

First Achilles School - "*HIGH-THROUGHPUT SCREENING TECHNOLOGIES – The Single Cell Code of Tendons"* (Hybrid event)

Department of Musculoskeletal Regeneration, Orthopaedic Hospital König-Ludwig-Haus, University of Würzburg, Germany, 23 - 24 March 2022

Second Achilles School - *"ADVANCES IN ORTHOPAEDIC TISSUE ENGINEERING"* (Hybrid event)

The Regenerative, Modular & Developmental Engineering Laboratory (REMODEL), University College Dublin, Ireland, 6 – 7 April 2022



First Scientific Retreat

König-Ludwig-Haus, Lecture hall of the Center for Mental Health, Germany, 25 March 2022

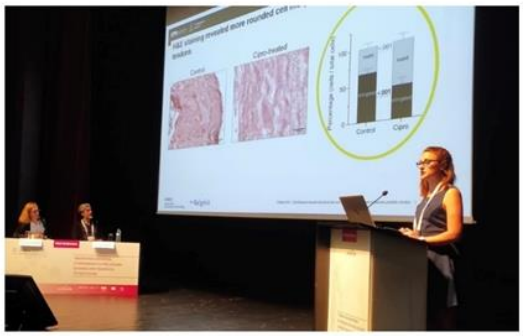
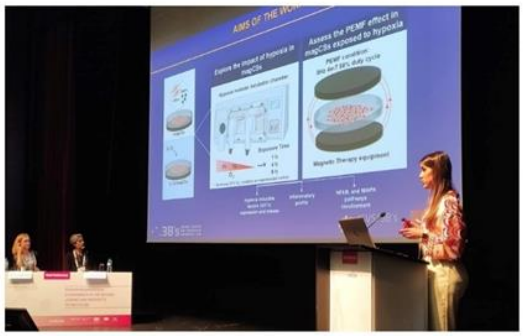
Second Scientific Retreat

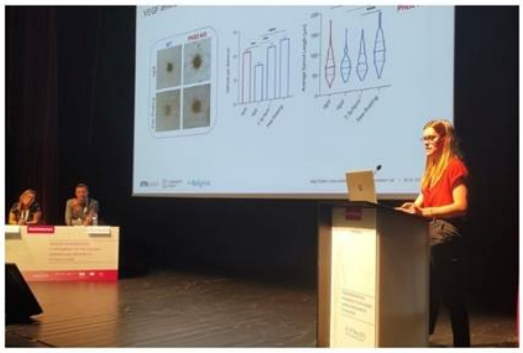
Centro Cultural Vila Flor, Guimarães, Portugal 27 May 2022

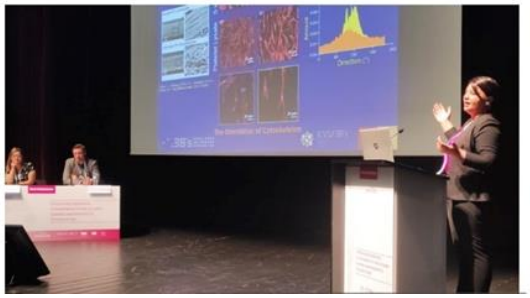
Third Scientific Retreat

3B's Research Group, University of Minho, 7 June 2022

Final Achilles Conference – *Tendon Regeneration: a throwback to the lessons learned and prospects to the future*

What cells source?
Should be representative of Tendon microenvironment


Final Achilles Conference 25-27 May 2022, CCVF Guimarães, Portugal
ACHILLES








ACHILLES

ACHILLES

CONFERENCES AND NETWORKING

Attended

12th BSRT Online Symposium

29 November – 3 December 2021

8th FEBS Advanced Lecture Course

Greece, 5 - 10 May 2022

Organization of symposia/ conference

28th European Orthopedic Research Society

17-18 September 2020, Izmir, Turkey

Achilles Twinning H2020 Project – Overcoming specific weaknesses in tendon biology to design advanced regenerative therapies

European Society for Biomaterials Conference

5 - 9 September 2021, Porto, Portugal

Advanced technologies and cellular approaches for the development of precise 3D tendon and other musculoskeletal tissue substitutes and models to understand regeneration mechanisms

29th European Orthopedic Research Society (EORS) Annual Meeting

15-17 September 2021, Rome, Italy

Bioengineered cell instructive tactics for biological tendon repair and regeneration



TERMIS 6th World Congress

15 - 19 November 2021, Maastricht, the Netherlands

Tackling tendon disease: updates on tendon fatigue, degeneration and healing

TERMIS-EU 2022

28 June – 1 July 2022, Krakow, Poland

Prospects and Challenges in Biological Therapies for Tendon Regeneration

31st European Orthopedic Research Society (EORS) Annual Meeting

4-6 October 2023, Porto, Portugal

Hosted by Prof. Manuela E. Gomes, Chair of the conference (3B's Research Group, University of Minho)

DISSEMINATION AND COMMUNICATION

Publications

Gonçalves, A. I., Rodrigues, M. T., Matos, A. M., Almeida, H., Gómez-Florit, M., Domingues, R. M., & Gomes, M. E. (2020). Multiscale multifactorial approaches for engineering tendon substitutes. Organ Tissue Engineering, 1-24, Springer.

Lin, D., Alberton, P., Delgado Caceres, M., Prein, C., Clausen-Schaumann, H., Dong, J., ... & Docheva, D. (2020). Loss of tenomodulin expression is a risk factor for age-related intervertebral disc degeneration. Aging Cell, 19(3), e13091.

Frankewycz, B., Henssler, L., Weber, J., Platz Batista da Silva, N., Koch, M., Jung, E. M., ... & Pfeifer, C. G. (2020). Changes of material elastic properties during healing of ruptured achilles tendons measured with shear wave elastography: A pilot study. International journal of molecular sciences, 21(10), 3427.

Yan, Z., Yin, H., Brochhausen, C., Pfeifer, C. G., Alt, V., & Docheva, D. (2020). Aged tendon stem/progenitor cells are less competent to form 3D tendon organoids due to cell autonomous and matrix production deficits. Frontiers in bioengineering and biotechnology, 8, 406

Vinhas, A., Rodrigues, M. T., Gonçalves, A. I., Reis, R. L., & Gomes, M. E. (2020). Magnetic responsive materials modulate the inflammatory profile of IL-1β conditioned tendon cells. Acta Biomaterialia, 117, 235-245.

Teixeira, S. P., Domingues, R. M., Shevchuk, M., Gomes, M. E., Peppas, N. A., & Reis, R. L. (2020). Biomaterials for sequestration of growth factors and modulation of cell behavior. Advanced Functional Materials, 30(44), 1909011.

Matos, A. M., Gonçalves, A. I., Rodrigues, M. T., Miranda, M. S., El Haj, A. J., Reis, R. L., & Gomes, M. E. (2020). Remote triggering of TGF-β/Smad2/3 signaling in human adipose stem cells laden on magnetic scaffolds synergistically promotes tenogenic commitment. Acta Biomaterialia, 113, 488-500.

Yin H., Strunza F., Yana Z., Luc J., Brochhausend C., Kiderlene S., Clausen-Schaum H., Wang X., Gomes M. E., Alta V., Docheva D. Three-dimensional self-assembling nanofiber matrix rejuvenates aged/degenerative human tendon stem/progenitor cells, Biomaterials, Vol. 236, doi:10.1016/j.biomaterials.2020.119802, 2020

Chu, J., Lu, M., Pfeifer, C. G., Alt, V., & Docheva, D. (2020). Rebuilding tendons: a concise review on the potential of dermal fibroblasts. Cells, 9(9), 2047.

Steinmann, S., Pfeifer, C. G., Brochhausen, C., & Docheva, D. (2020). Spectrum of tendon pathologies: Triggers, trails and end-state. International journal of molecular sciences, 21(3), 844.

Tsiapalis, D., Kearns, S., Kelly, J. L., & Zeugolis, D. I. (2021). Growth factor and macromolecular crowding supplementation in human tenocyte culture. Biomaterials and Biosystems, 1, 100009.

Garnica-Galvez, S., Korntner, S. H., Skoufos, I., Tzora, A., Diakakis, N., Prassinos, N., & Zeugolis, D. I. (2021). Hyaluronic acid as macromolecular crowder in equine adipose-derived stem cell cultures. Cells, 10(4), 859

Modulation of stem cell response using biodegradable polyester films with different stiffness, Ribeiro,S., Pugliese, E., Korntner, S.H., Fernandes, E.M., Gomes, M.E., Reis, R.L., Bayon, Y and D.I. Zeugolis; 2021 Biomedical Engineering Advances 2: 100007.

Development and characterisation of cytocompatible polyester substrates with tunable mechanical properties and degradation rate; Ribeiro, S., Carvalho, A.M., Fernandes, E.M., Gomes, M.E., Reis, R.L., Bayon, Y. and D.I. Zeugolis; 2021; Acta Biomaterialia 121(303-315).

Xu, Y., Yin, H., Chu, J., Eglin, D., Serra, T., & Docheva, D. (2021). An anisotropic nanocomposite hydrogel guides aligned orientation and enhances tenogenesis of human tendon stem/progenitor cells. Biomaterials Science, 9(4), 1237-1245.

Zhang, J., Geiger, Y., Sotier, F., Djordjevic, S., Docheva, D., Sudhop, S., ... & Huber, H. P. (2021). Extending Single Cell Bioprinting from Femtosecond to Picosecond Laser Pulse Durations. Micromachines, 12(10), 1172.

Chu, J., Pieles, O., Pfeifer, C. G., Alt, V., Morsczeck, C., & Docheva, D. (2021). Dental follicle cell differentiation towards periodontal ligament-like tissue in a self-assembly three-dimensional organoid model. Eur Cell Mater, 41, 20-33.

Delgado Caceres, M., Angerpointner, K., Galler, M., Lin, D., Michel, P. A., Brochhausen, C., ... & Docheva, D. (2021). Tenomodulin knockout mice exhibit worse late healing outcomes with augmented trauma-induced heterotopic ossification of Achilles tendon. Cell Death & Disease, 12(11), 1-13.

Vinhas, A., Gonçalves, A. I., Rodrigues, M. T., & Gomes, M. E. (2021). Human tendon-derived cell sheets created by magnetic force-based tissue engineering hold tenogenic and immunomodulatory potential. Acta Biomaterialia, 131, 236-247.

Pardo, A., Gómez-Florit, M., Barbosa, S., Taboada, P., Domingues, R. M., & Gomes, M. E. (2021). Magnetic nanocomposite hydrogels for tissue engineering: design concepts and remote actuation strategies to control cell fate. ACS nano, 15(1), 175-209.

Teixeira, S. P., Domingues, R. M., Babo, P. S., Berdecka, D., Miranda, M. S., Gomes, M. E., ... & Reis, R. L. (2021). Epitope-imprinted nanoparticles as transforming growth factor-β3 sequestering ligands to modulate stem cell fate. Advanced Functional Materials, 31(4), 2003934.

Almeida, A. F., Vinhas, A., Gonçalves, A. I., Miranda, M. S., Rodrigues, M. T., & Gomes, M. E. (2021). Magnetic triggers in biomedical applications–prospects for contact free cell sensing and guidance. Journal of Materials Chemistry B, 9(5), 1259-1271.

Zhang, J., Byers, P., Erben, A., Frank, C., Schulte-Spechtel, L., Heymann, M., ... & Clausen-Schaumann, H. (2021). Single Cell Bioprinting with Ultrashort Laser Pulses. Advanced Functional Materials, 31(19), 2100066.

Graça, A. L., Domingues, R. M., Calejo, I., Gómez-Florit, M., & Gomes, M. E. (2022). Therapeutic Effects of Platelet-Derived Extracellular Vesicles in a Bioengineered Tendon Disease Model. International journal of molecular sciences, 23(6), 2948.

Gonçalves, A. I., Vinhas, A., Rodrigues, M. T., & Gomes, M. E. (2022). The impact of cryopreservation in signature markers and immunomodulatory profile of tendon and ligament derived cells. Journal of Cellular Physiology, 237(1), 675-686.

Graça, A. L., Gómez-Florit, M., Osório, H., Rodrigues, M. T., Domingues, R. M., Reis, R. L., & Gomes, M. E. (2022). Controlling the fate of regenerative cells with engineered platelet-derived extracellular vesicles. Nanoscale, 14(17), 6543-6556.

Rampin, A., Skoufos, I., Raghunath, M., Tzora, A., Diakakis, N., Prassinos, N., & Zeugolis, D. I. (2022). Allogeneic serum and macromolecular crowding maintain native equine tenocyte function in culture. Cells, 11(9), 1562.

Calejo I, Labrador-Rached CJ, Gomez-Florit M, Docheva D, Reis RL, Domingues RMA, Gomes ME. Bioengineered 3D Living Fibers as In Vitro Human Tissue Models of Tendon Physiology and Pathology, Adv Healthc Mater. 2022 May 21:e2102863. doi: 10.1002/adhm.202102863

Other Editorial initiatives

Special Issue "Tendons & Ligaments: from Biology to Biofabrication", eCM journal

Guest Edited by Prof. Denitsa Docheva, Prof. Britt Wildemann, Prof. Manuela E. Gomes and Prof. Dimitrios Zeugolis

Special Issue "Magnetic Systems for Regenerative Medicine", Advanced Functional Materials, Wiley

Guest Edited by Prof Manuela Gomes

Special issue "Advanced strategies to bridge the gap between inflammation and tissue regeneration", Advanced Drug Delivery Reviews, Elsevier

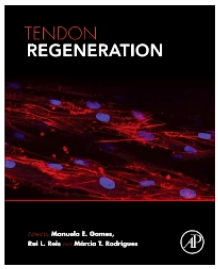
Guest Edited by Prof Manuela Gomes and Dr Márcia Rodrigues

Special Issue "Cell Communication in Tendon Engineering", International Journal of Molecular Sciences, MDPI

Guest Edited by Prof Manuela Gomes and Dr Márcia Rodrigues

Second edition of the Book "Tendon Regeneration: Understanding Tissue Physiology and Development to Engineer Functional Substitutes", Elsevier

Editors: Prof Manuela Gomes, Prof Rui Reis, Dr Márcia Rodrigues, Dr Ana Gonçalves, Prof Denitsa Docheva, and Prof Dimitrios Zeugolis



Preview

View on ScienceDirect

Tendon Regeneration
Understanding Tissue Physiology and Development to Engineer Functional Substitutes
1st Edition - August 8, 2015
☆☆☆☆☆ Write a review
Editors: Manuela Gomes, Rui Reis, Márcia Rodrigues
Paperback ISBN: 9780128015902
eBook ISBN: 9780128016008

@AchillesH2020

Website: achilles.i3bs.eu

The ACHILLES project has received funding from the European Union's Horizon 2020 Research and Innovation programme, under the Grant Agreement Number 810850.