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# *Life with little oxygen – attractive and worthwhile?*


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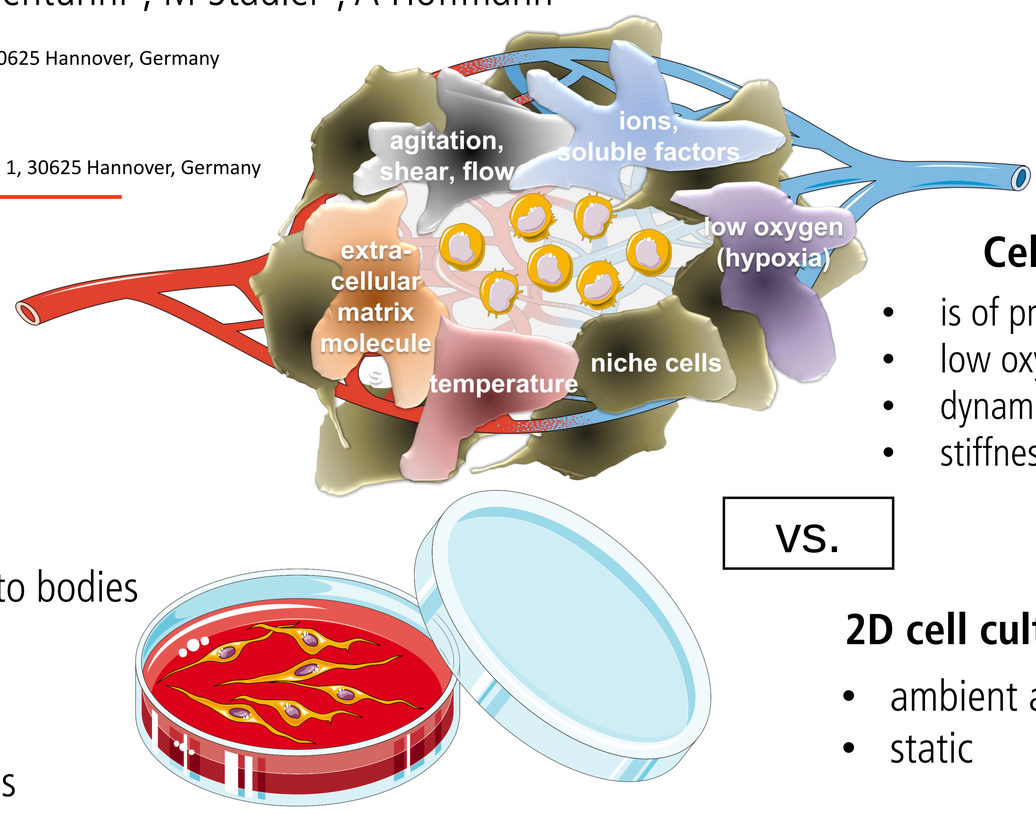
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## Background

- Growing number of patients with musculoskeletal disorders
- Promising cell source for cell-mediated therapeutic approaches: **huMSCs** (human bone marrow derived mesenchymal stromal cells)
- Challenge to conventional cell culture: isolation of the cells from bodies, subsequent culture manipulation, and eventually, transplantation back into bodies – all steps associated with dramatic changes in oxygen level
- Adaptations of cells to oxygen concentration = maintenance of beneficial properties of huMSCs and contribution to improve cell-mediated therapies



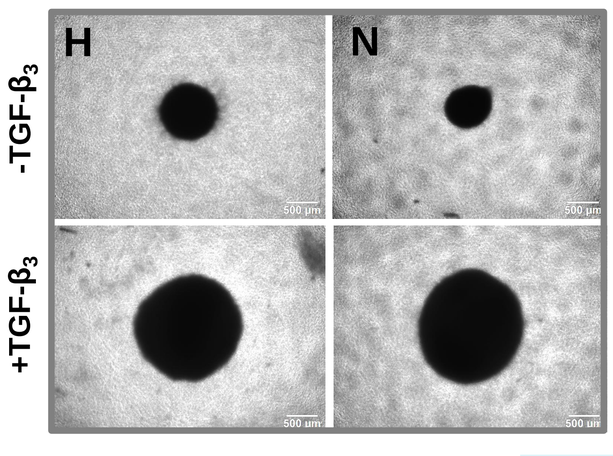

### Cell niche

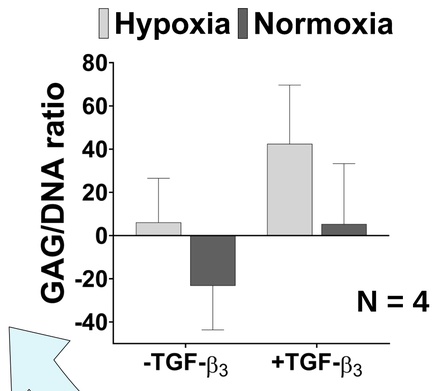
- is of prime importance
- low oxygen content
- dynamic
- stiffness

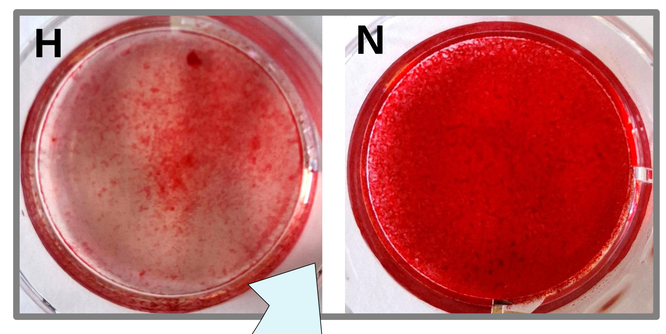
### 2D cell culture

- ambient air
- static

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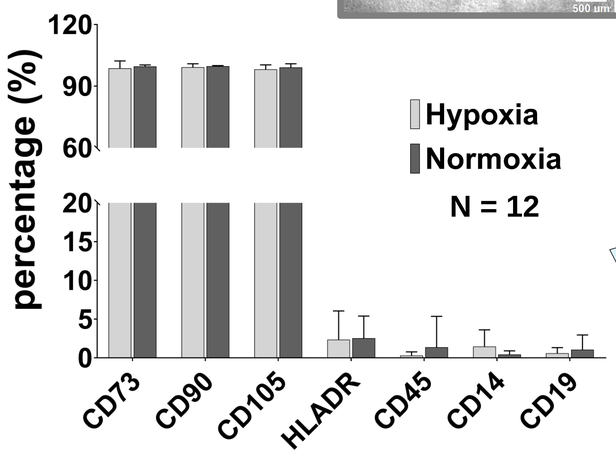


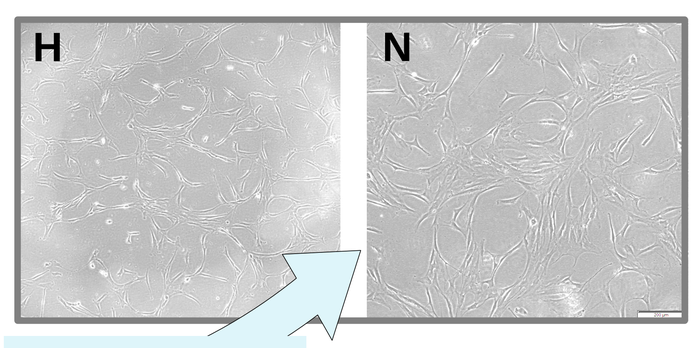




Chondrogenesis

Osteogenesis

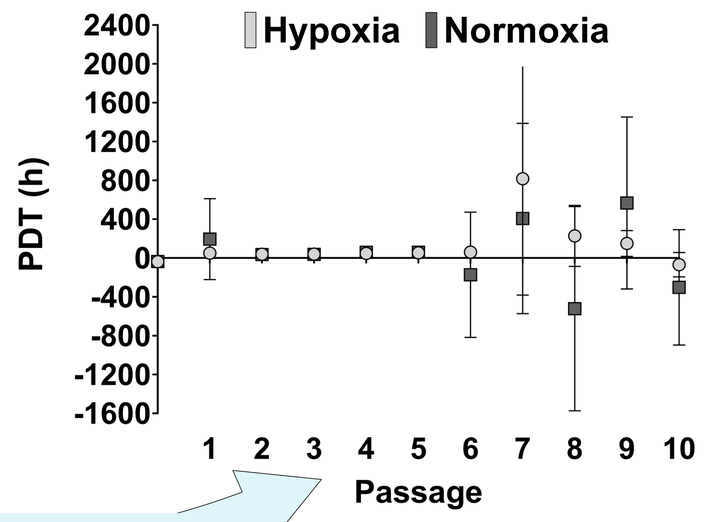



Morphology

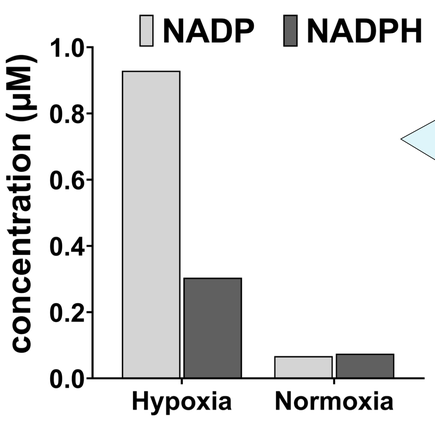
FCM



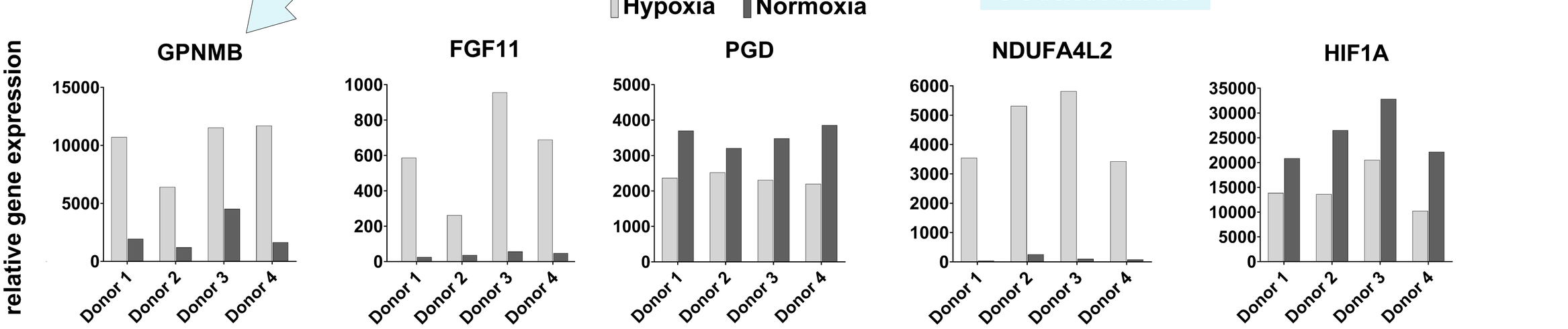




Proliferation

Metabolism




RNA-Sequencing




## Summary/Conclusion

Our studies reveal that specific features of huMSCs like surface antigens do not appear to be notably influenced by oxygen levels. Furthermore, genes like HIF1A, known to be upregulated under hypoxic conditions, as well as genes like GPNMB, FGF11, and PGD with less clear oxygen-related features are differentially expressed. Interestingly, HIF1A is downregulated in several donors under hypoxia.

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