

The mechanosensitive channel Piezo1 is a mediator of mechanical forces in bone marrow endothelial cells

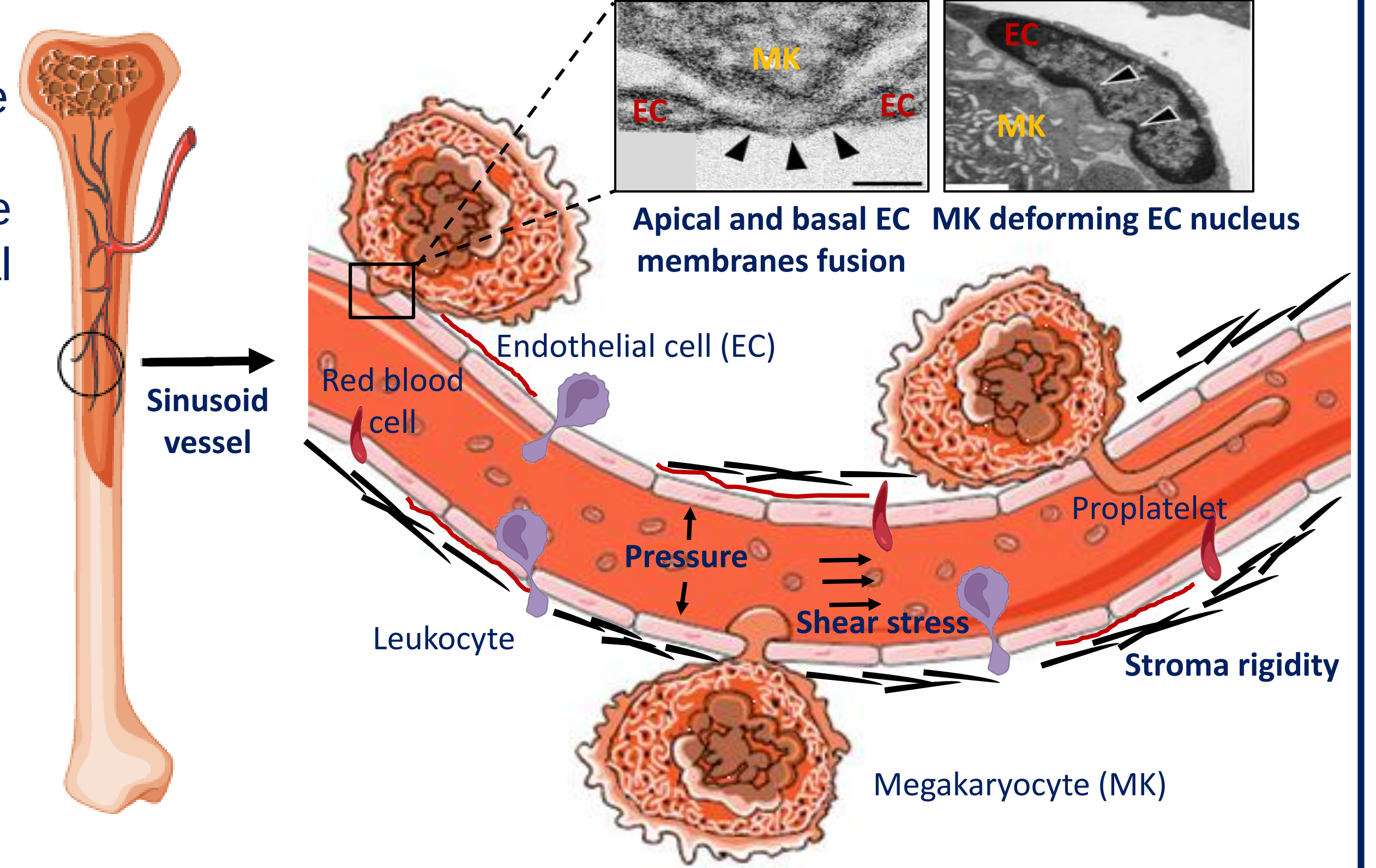
Introduction

- Every day 500 billions of cells enter the circulation via specialized capillaries in the bone marrow : **the sinusoid vessels**.
- Sinusoid vessels constitute the **Blood-Bone Marrow Barrier (BBMB)**, and are composed of a monolayer of endothelial cells and a thin discontinuous basal membrane.
- Mechanosensitive channels (MSC)** are expressed in various endothelial cells and are able to increase their opening probability in response to mechanical cues.
- Among them, **Piezo1** is known to be a regulator of **endothelial barrier integrity**.

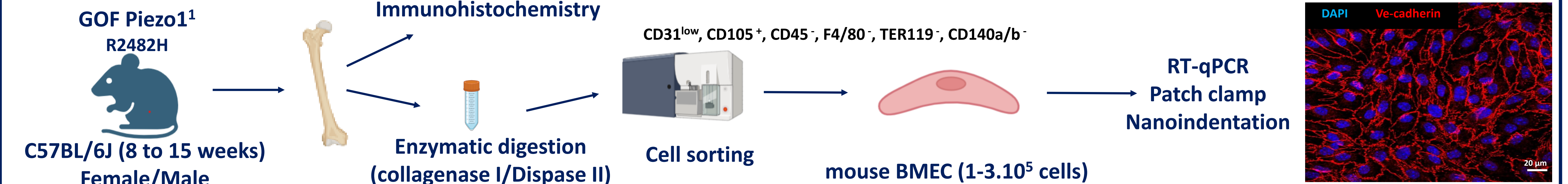
How does Piezo1 regulates the Blood-Bone Marrow barrier permeability ?

Aims

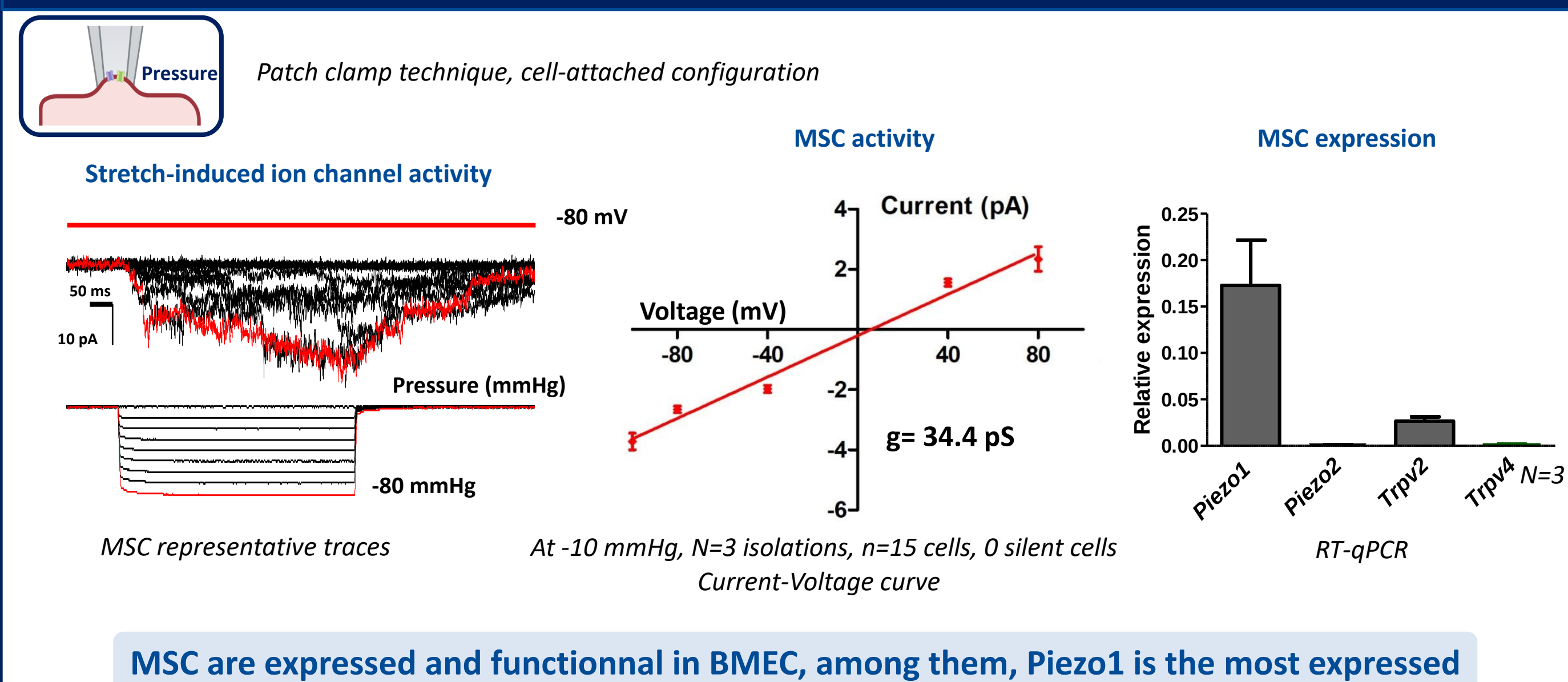
- Characterizing Piezo1 in Bone Marrow Endothelial Cells (BMEC).
- Identifying Piezo1 involvement in BBMB permeability.



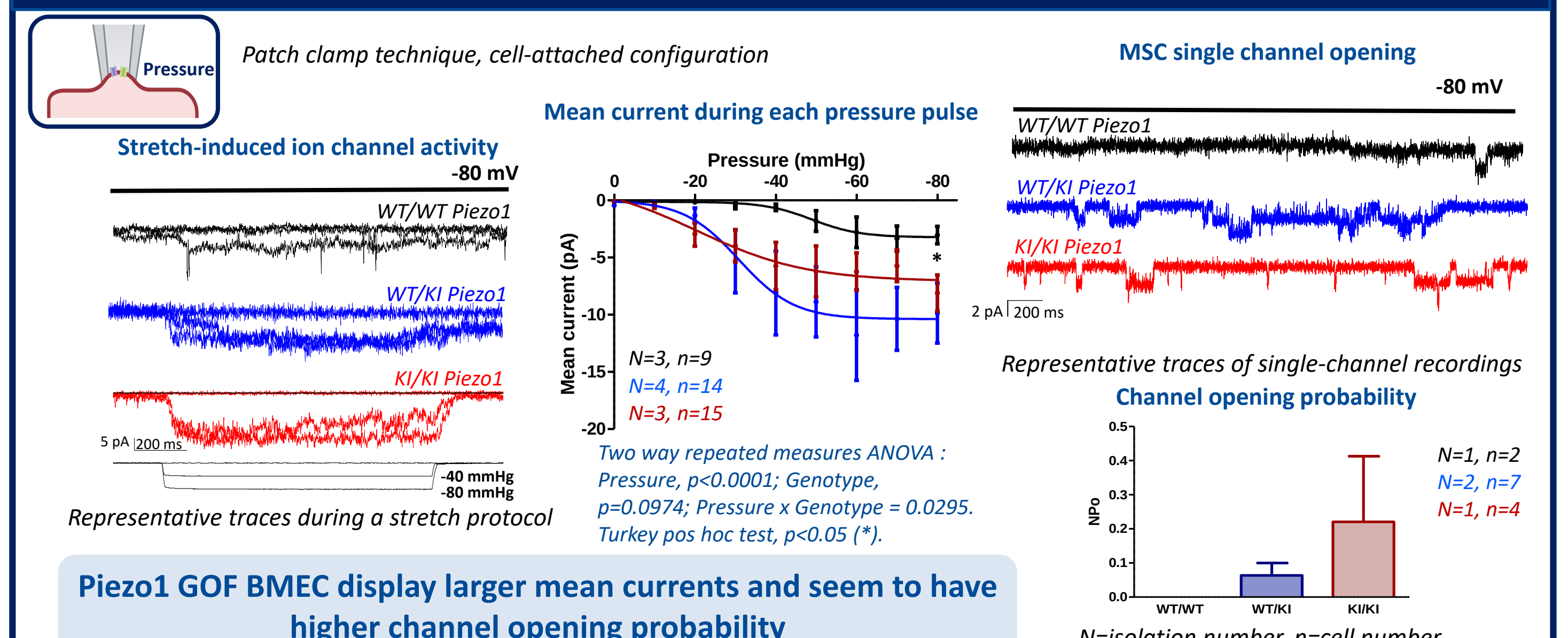
Methods



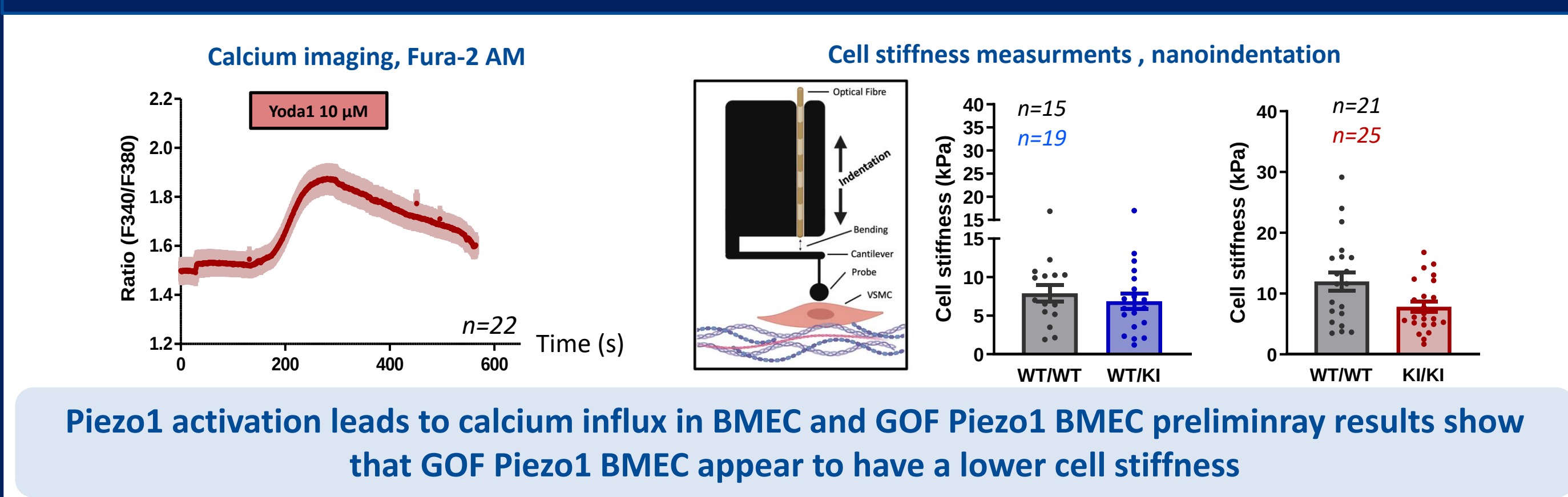
1. Mechanosensitive ion channels are expressed in BMEC



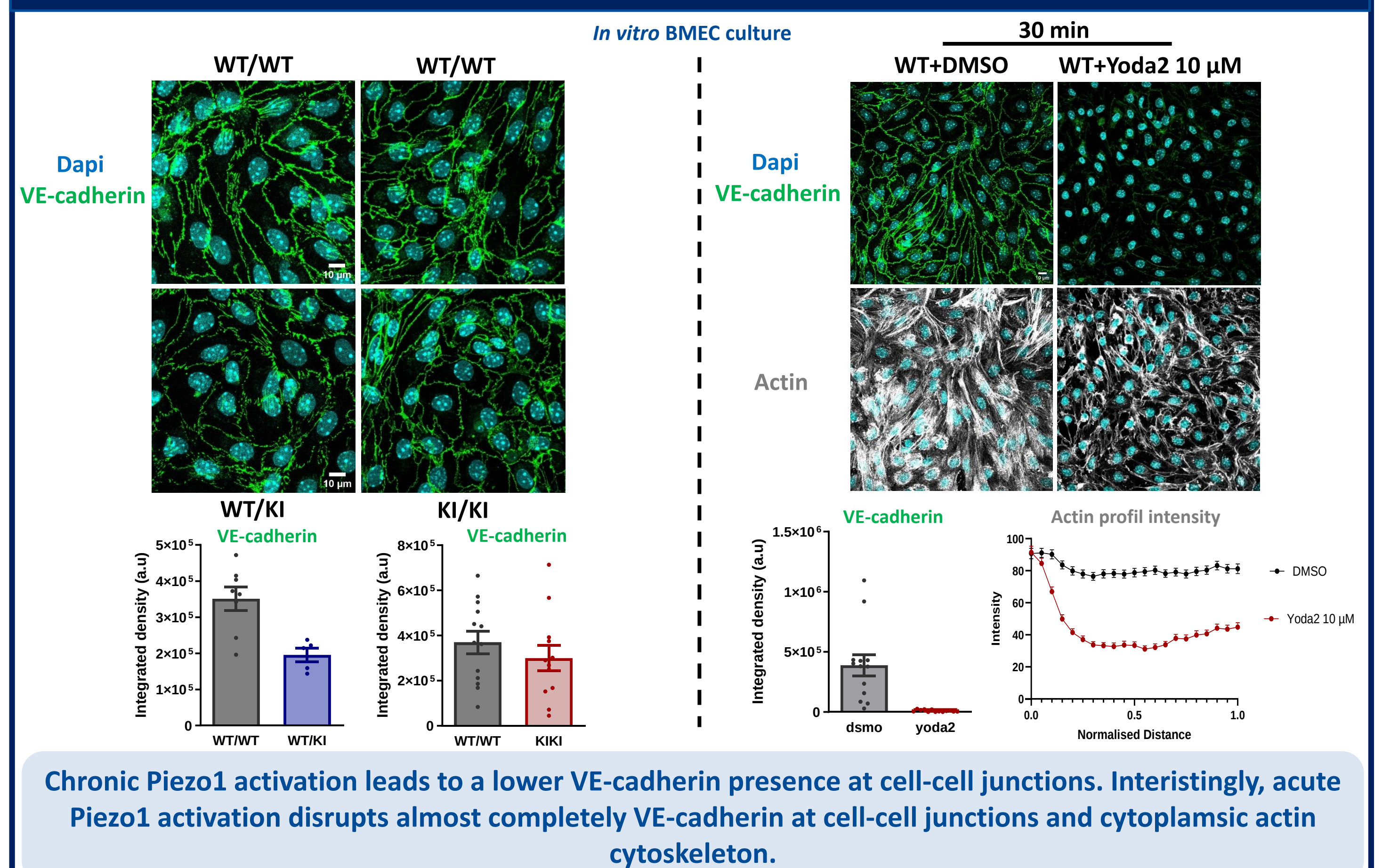
2. Piezo1 Gain Of Function (GOF) BMEC exhibit an increased activity



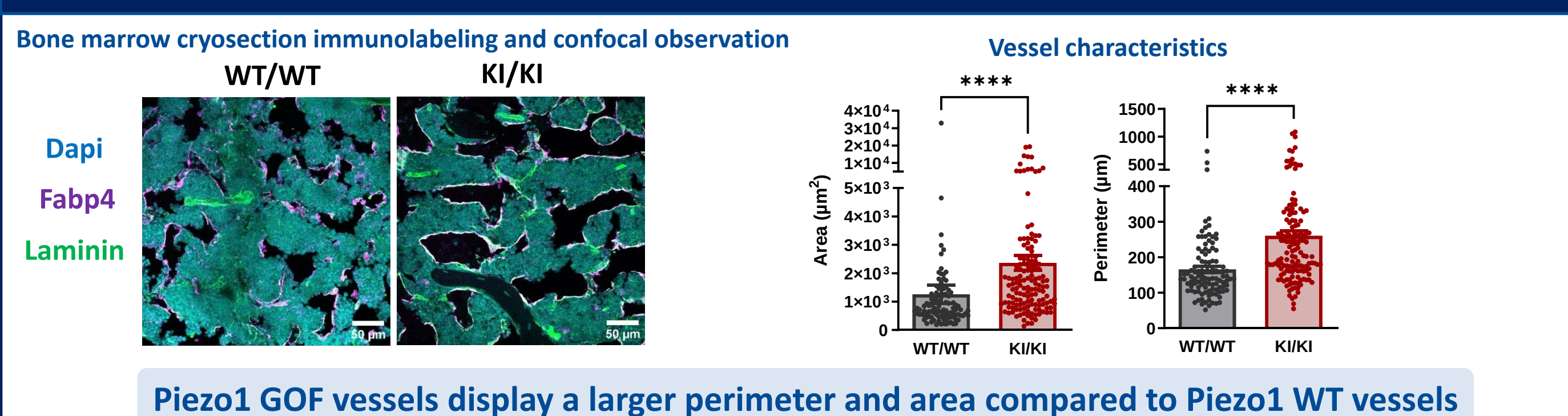
3. Piezo1 GOF leads to a lower cell stiffness in BMEC



4. Piezo1 activation disrupts adherens junctions in BMEC



5. Piezo1 GOF leads to larger sinusoid vessels *in situ*



Conclusions

- MSC are expressed and functional in BMEC. Piezo1 is highly expressed and functional in BMEC.
- Piezo1 activity** leads to a lower cell stiffness and a **desorganised actin cytoskeleton and VE-cadherin network**.
- Piezo1 activation leads to a modification in **vessel morphology** in bone marrow.

Outlook :

How does Piezo1 modulate **BMEC permeability** ? How BMEC mechanical properties are impacted by **Piezo1 knock out** ?

Acknowledgements:

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Supported by:



References:

- Bachelot-Loza C et al., 2025, Journal of Thrombosis and Haemostasis