

Engineered biohybrid vasculature for colorectal organoids

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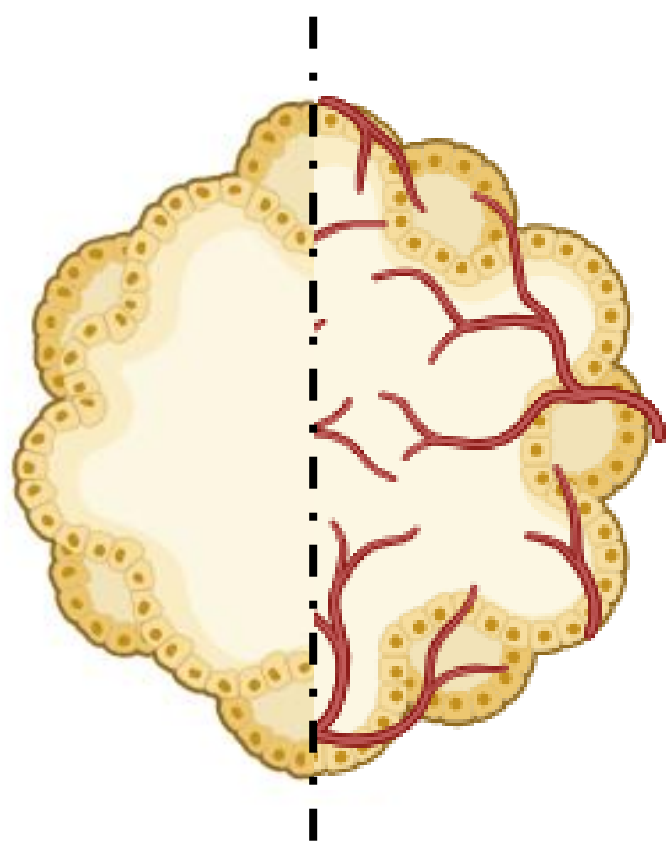
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Motivation

Organoids have advantages and limitations

Tissue of interest
3D culture environment
Native morphology and functions
Easy to maintain and manipulate
Lack of functional vasculature

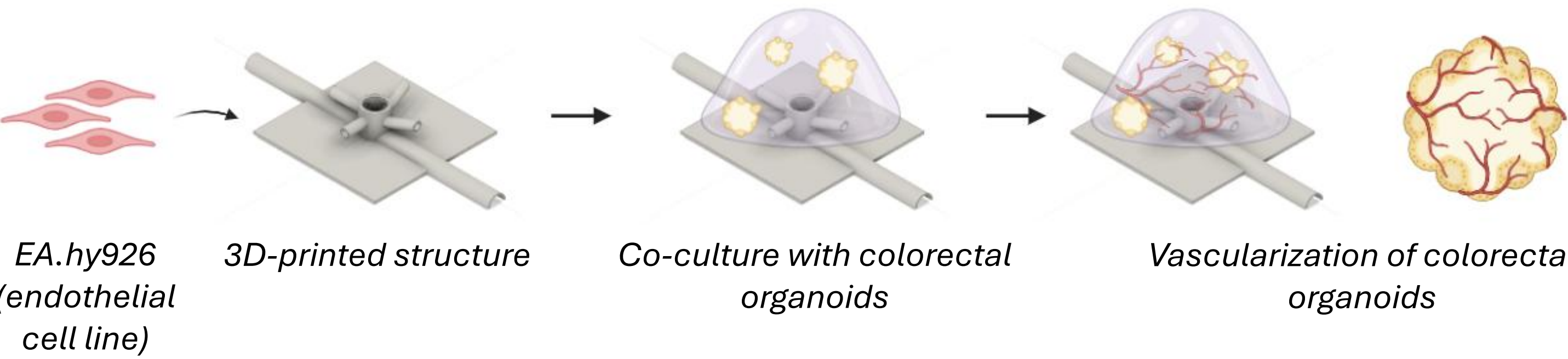


Role of vasculature and endothelial cells

Exchange of oxygen and nutrients
Paracrine signalling
Basement membrane interactions
Size and lifespan of organoids

Aim

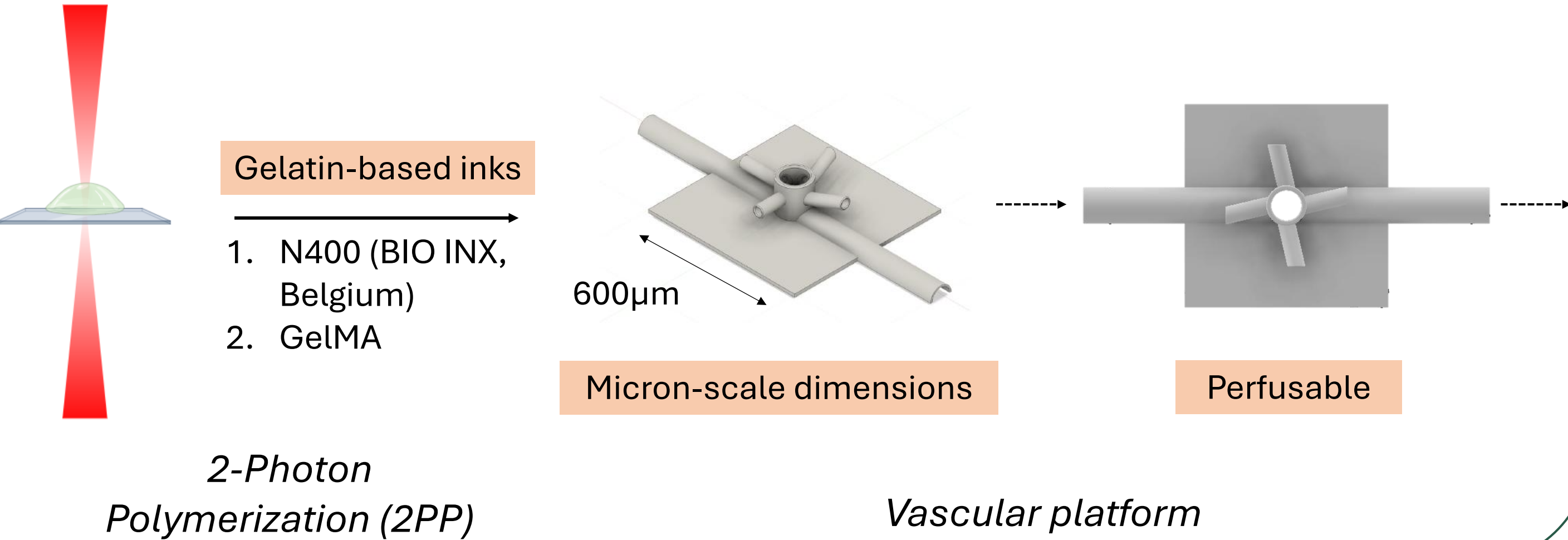
Aim: To vascularize colorectal organoids using a 3D-printed biohybrid platform



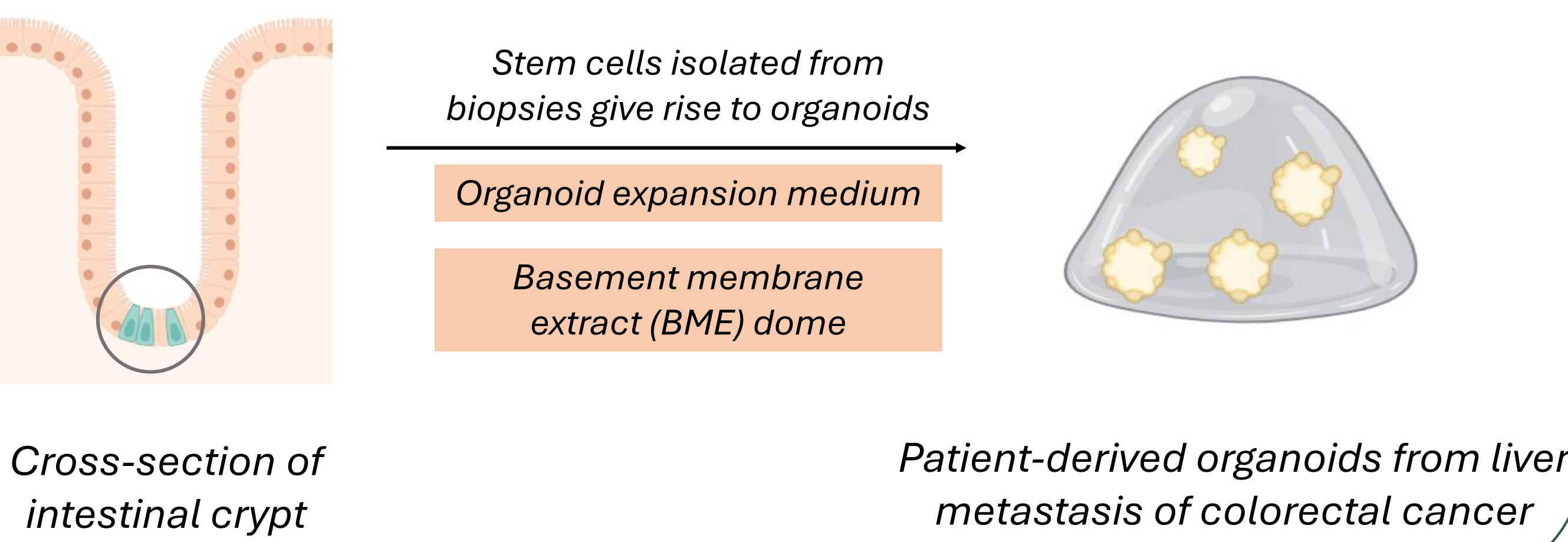
Methods

A two-step approach

1 3D-PRINTED PLATFORM



2 COLORECTAL ORGANOIDS

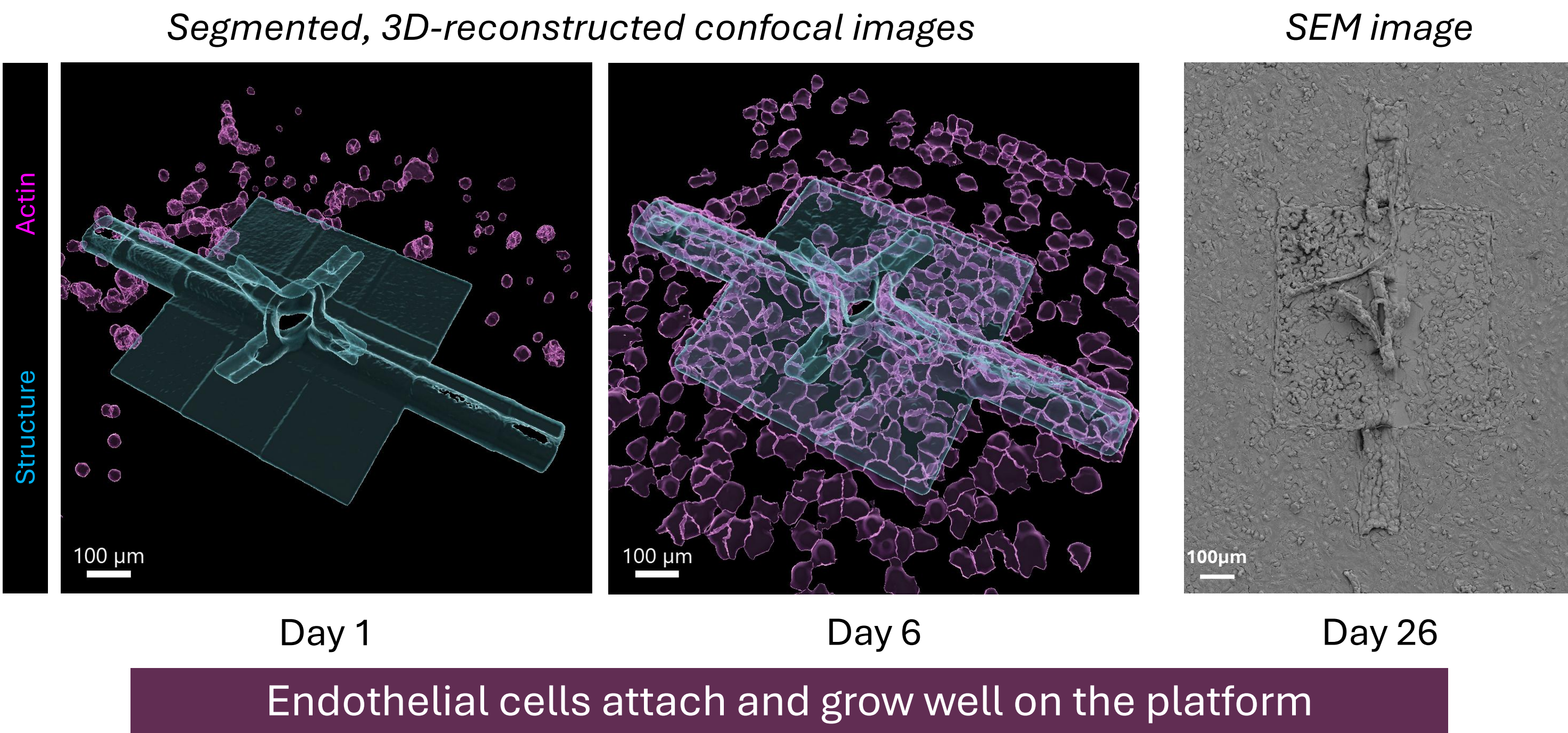


References

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Results

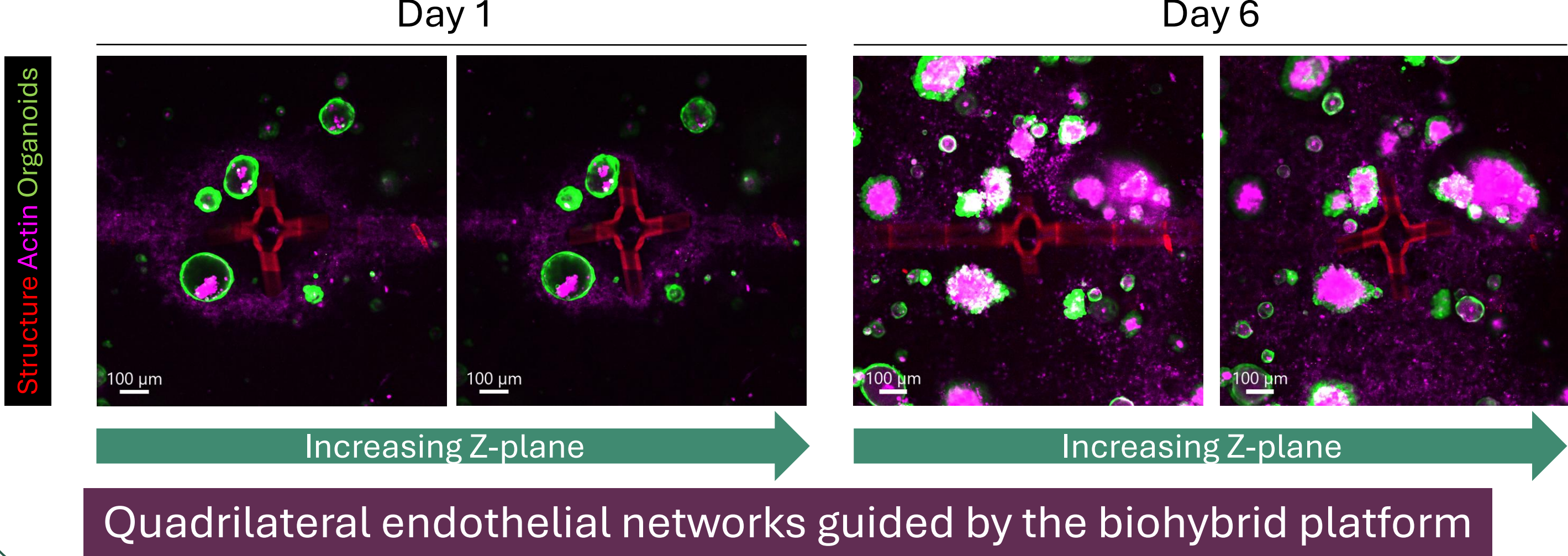
Endothelial biohybrid platform



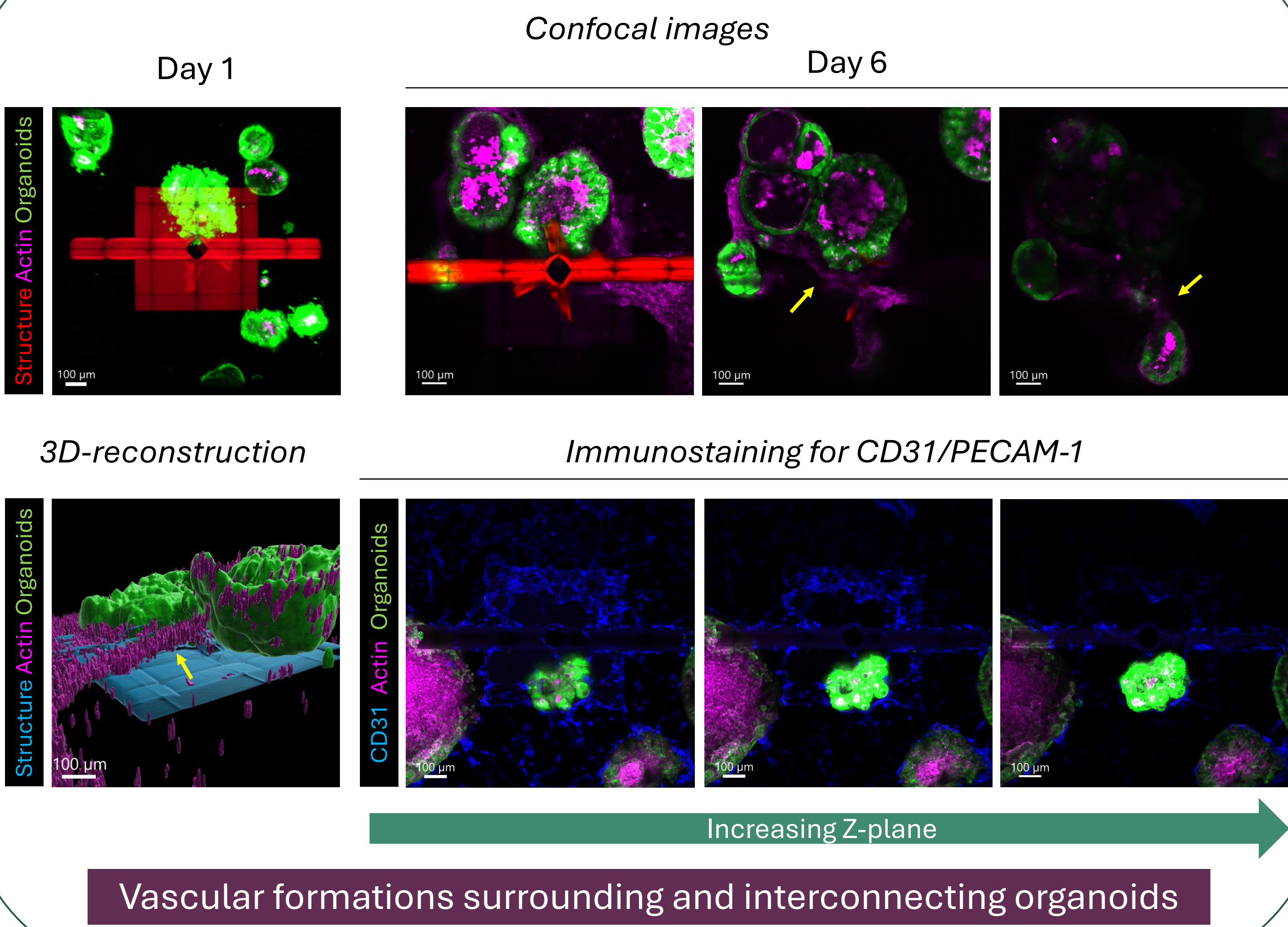
Endothelial cells attach and grow well on the platform

Organoid co-culture with biohybrid platform

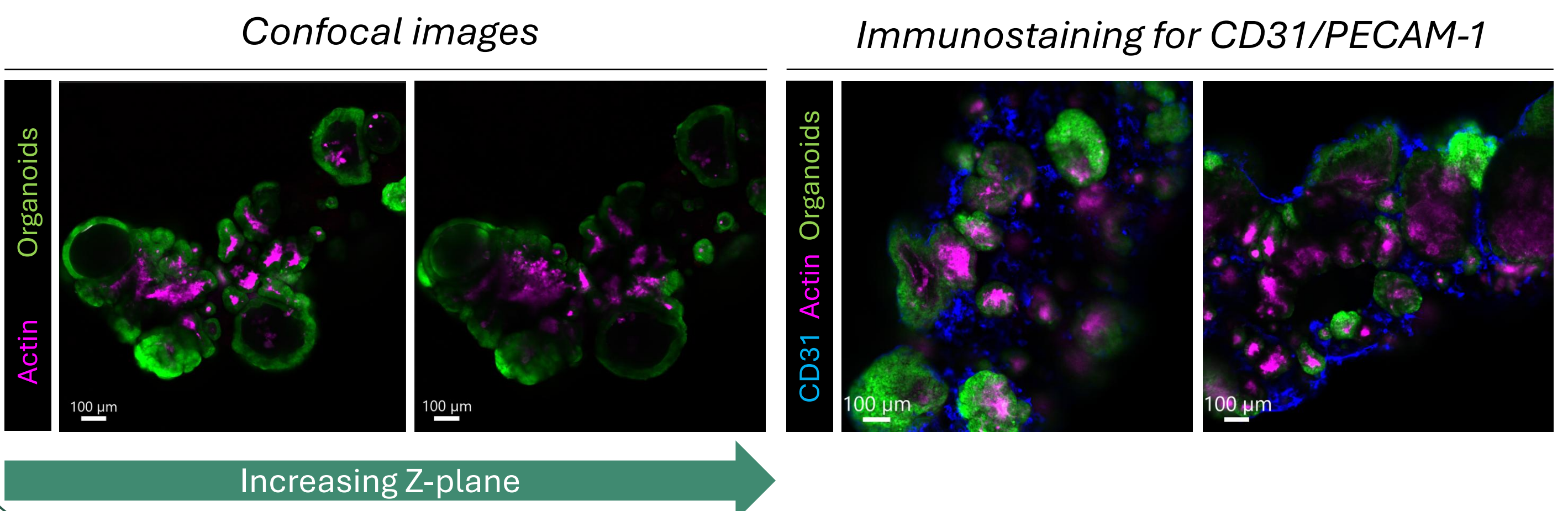
COMMERCIAL INK N400



GelMA-BASED INK



CONTROL



Acknowledgements

- Dr. Florencia Diaz, Paolo Chiaranda, and Sebastian Weber for their contributions.
- The presenting author was funded within the Max Planck School Matter to Life, supported by the Dieter Schwarz Foundation in collaboration with the Max Planck Society.
- Graphics created using biorender.com



Conclusion

Our platform

- ✓ Supports long-term EA.hy926 growth
- ✓ Guides the development of uniform endothelial networks
- ✓ Results in physiological epithelium-endothelium orientation
- ✓ Gives rise to vascular networks connecting organoids

Future Outlook

- Media perfusion
- Evaluation of molecular interactions
- Uniform, controlled studies of drug toxicity and immune trafficking in organoids