



**Showcasing a critical review from the laboratory of Dr. Giulia Adriani at the Agency for Science, Technology and Research (A\*STAR), Singapore.**

Engineering perfusion to meet tumor biology: are vascularized tumor-on-a-chip models ready to drive therapy innovation?

This review provides an in-depth look at how abnormal tumor blood vessels drive therapy resistance, metastasis and immune escape, and showcases the latest cutting-edge microphysiological systems that recreate perfused, human-relevant vasculature within 3D tumor microenvironments. By integrating advances in biomaterials, microfluidic engineering and patient-derived organoids, the article maps current drug-testing efforts, highlights translational and standardization gaps, and points to how vascularized tumor-on-a-chip systems can inform functional precision oncology and the rational design of next-generation vascular-targeted cancer therapies.

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**As featured in:**



See Giulia Adriani *et al.*,  
*Lab Chip*, 2026, **26**, 1162.