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FUNCTIONAL METAL-ORGANIC FRAMEWORKS (MOFS)-BASED DEVICES FOR CELL RECOGNITION AND DRUG DELIVERY

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Circulating tumor cells (CTCs) are capable of initiating cancer metastasis by migrating through the vascular system with the potential to reflect the molecular profile and developmental stage of the primary tumor they escaped. Metal-organic frameworks (MOFs)-based devices have been developed with multifunctionalities for targeted tumor cell capture, on-chip analysis as well as controllable drug release typically in situations where only hundreds of CTCs coexist with 109 normal cells. The free acid groups borne by the MOF have undergone postsynthetic modification (PSM) to express antiepithelial cell adhesion molecule (anti-EpCAM) antibody, making it a promising candidate for immunotrapping strategies. The resulting MOF-based devices exhibited excellent capture capability and selectivity. Crucially, its structural properties also rendered the MOF capable of delivering drug cargoes and controllably releasing them in response to external stimuli with enormous potential in personalized therapy development.