

Medical Microrobots for Intrauterine Embryo Transfer: Toward Precision Reproductive Medicine

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Recent advances in microrobotics are opening exciting new frontiers in assisted reproductive technologies. In this talk, I will present our latest developments in bioinspired medical microrobots designed to navigate and operate within the female reproductive tract, with a focus on intrauterine embryo transfer (IET). Traditional IET methods often lack precision and may result in suboptimal implantation outcomes. Our approach leverages magnetically guided microcarriers capable of controlled motion and targeted embryo release at optimal implantation sites. I will discuss the engineering principles behind these systems, their biocompatibility, and performance in biologically relevant models. This technology holds promise for improving embryo placement accuracy, reducing the number of required IVF cycles, and personalizing fertility treatments. The integration of microrobotics into reproductive medicine represents a transformative step toward minimally invasive, intelligent, and patient-tailored therapies.