

Biological Micromanipulation Technologies with Its Application in Zebrafish Larvae

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Micromanipulation technology has been an increasingly hot research topic that enables new science discoveries and industrial applications by multidisciplinary interaction. This lecture will introduce cutting-edge micromanipulation technologies especially focusing on biological targets, such as zebrafish, a kind of important vertebrate organisms widely used in scientific research and bioindustry. However, traditional manual operation of zebrafish larva is laborious and time-consuming due to its complicated structures, fragile body, and inaccessible *in vivo* organs. Here we develop an automated micromanipulation system that is capable of rotating zebrafish to desired orientation, capturing it in a low-damage manner, locating its heart in three dimensions. The system performed a complete zebrafish heart injection with a superfast speed of less than sixty seconds, which has potential applications in developing disease model, studying tissue regeneration, and testing new drugs.