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Application of a microfluidic chip-based 3D co-culture to test drug sensitivity for individualized treatment of lung cancer

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Individualized treatment is a promising clinical strategy for lung cancer, and drug sensitivity testing is fundamental to this scheme. We aimed to develop an effective drug sensitivity test platform to support individualized treatment. We designed a microfluidic chip-based, three-dimensional (3D) co-culture drug sensitivity test platform. A mono-lung cancer cell line, a mixture of lung cancer and stromal cell lines, and cells from fresh lung cancer tissues were cultured in 3D under continuous media supplementation, mimicking the actual tumor microenvironment *in vivo*. The cells were treated with anti-cancer drugs according to a gradient concentration generator inside the chips to screen the appropriate chemotherapy schemes. We successfully cultured cell lines or primary cells with this device. We also smoothly assayed the sensitivities of different anti-cancer drugs in parallel and accurately screened appropriate-dose, single and combined-drug chemotherapy schemes for eight patients. Our microfluidic device is a simple, reliable, and high-throughput platform to test drug sensitivity. It would be possible for chemotherapists to screen the appropriate chemotherapy schemes to guide individualized treatment in lung cancer.

Biography

Wenxin Wang obtained his B.Sc in Polymer Science and Engineering at Si Chuan University, followed by his M.Sc and Ph.D. at Shanghai Jiao Tong University. After his Ph.D., Dr. Wang worked as Technology Officer at Shanghai Huayi Group for ayear. In 2000, Dr. Wang was awarded Services Federaux des Affaires Scientifiques Fellowship and worked at the Centre for Education and Research on Macromolecules at the University of Liege, Belgium for one year. From 2001 to 2008, Dr. Wang was a senior research fellow at the University of Nottingham, UK. In 2008, Dr. Wang joined NUI Galway in Ireland. Dr. Wang is the Science Foundation Ireland (SFI) Stokes Lecturer on Functional Biomaterials in the Department of Mechanical and Biomedical Engeering and Network of Excellence for Fuctional Biomaterials.

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