Influence of Location-Dependent Protuberance Damage on Cell Viability

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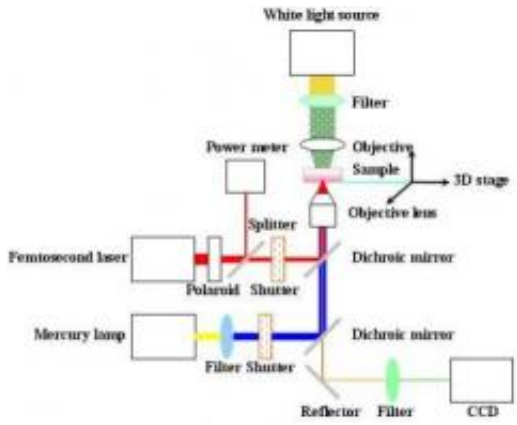


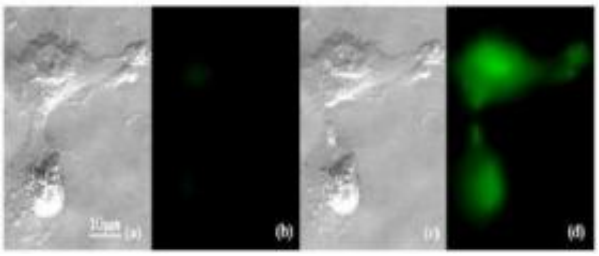
Femtosecond laser surgery experiment system. Credit: Science In China

The influence of femtosecond laser-induced damages on viability of olfactory ensheathing cells is investigated. Several cytokinetic phenomena including intracellular calcium wave, cellular morphologic change, recovery and death are discussed. Through systemic investigation, cellular activity can be controlled easily. The study is fulfilled by Hai-feng Yang et al., and reported in the Chinese Science Bulletin.

The investigations on femtosecond laser surgery have been increased steadily since König demonstrated in 1999 the dissection of isolated human chromosomes in Cell Mol Biol (1999, 45(2):195-201).

"Our research aims to investigate the influence of location-dependent protuberance damage on cell viability" noted Hai-feng Yang, a doctor student of Jiangsu University. "This is the first paper to carefully investigate cytokinetic phenomena using femtosecond laser, including intracellular calcium wave, cellular morphologic change, recovery and death."

The study involved two experiments. In the first experiment, Yang and his colleagues established an experimental system for femtosecond laser surgery and investigated the cellular viability after the surgery of cell protuberances. When the protuberance with smaller diameter was damaged in different locations, the cell could recover its activity. But when the protuberance with larger diameter was cut, the cell died.



Femtosecond laser-induced calcium wave in two adjacent olfactory ensheathing cells. Credit: Science In China

The second experiment showed that calcium wave could be observed after the protuberances of two adjacent cells were damaged. Meanwhile, Yang and his colleagues proposed four reasons for the formation of femtosecond laser-induced calcium wave.

The main conclusion is that cellular activity can be controlled easily. The cell damage and recovery mechanisms are proposed. This investigation

implies that femtosecond laser surgery is an important tool in many domains, such as the establishment of cell damage model, gene transfection and the study of cytokinetics.

Investigators of this research are from Photonics Fabrication Science Center and School of Medical Science and Laboratory Medicine, Jiangsu University, China. This research is helped by advisor Ming Zhou, colleagues Jian-ke Di, En-lan Zhao et al.

Reference: König K, Riemann I, Fischer P, et al. Intracellular nanosurgery with near infrared femtosecond laser pulses. Cell Mol Biol, 1999, 45(2): 195-201

Source: Science in China