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**Hollow Optical Fiber-Based Microplasma for Single Cell-Level Cancer Therapy**[1] JAE YOUNG KIM, Holcombe Department of Electrical and Computer Engineering, Center for Optical Materials Science and Engineering Technologies, Clemson University, JOHN BALLATO, PAUL FOY, THOMAS HAWKINS, YANZHANG WEI, JINHUA LI, SUNG-O KIM — While atmospheric pressure plasmas have been used in cancer therapies the size of the delivery systems precludes single cell treatments. Here, a highly flexible hollow-core optical fiber-based microplasma device is shown to treat individual tumor cells. It is observed that the microplasma not only induced apoptosis in cultured murine cells in a dose-dependent manner, but also, in some experimental conditions, selectively destroyed cultured tumor cells with no harm to cultured fibroblasts as indicated by an Annex V apoptosis assay. The induction of apoptosis in cultured murine tumor cells is confirmed further using an in situ apoptosis assay, which also showed a well-defined boundary between plasma-treated and non-treated areas. This work enables new directed cancer therapies based on highly flexible and precise hollow optical fiber-based plasma medicine and offers a unique path to understanding plasma-induced tumor cell apoptosis.

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