

陡脉冲电场对恶性肿瘤细胞杀伤效应的研究

孙才新¹、姚陈果¹、熊兰¹、米彦¹、廖瑞金¹、胡丽娜²、胡娅²

1 重庆大学高电压与电工新技术教育部重点实验室

2 重庆医科大学第二附属医院

观察不同参数(频率、脉宽、峰值)组合的陡脉冲电场对恶性肿瘤细胞的杀伤效应。将癌细胞悬液3 ml盛于玻璃瓶中,每次施加不同参数组合的电脉冲20 min,用MTT法测细胞死亡率,并制作生长曲线;观察细胞的超微结构变化。结果发现:不同参数组合的陡脉冲对癌细胞的杀伤有较大影响,随着参数值的增大,细胞死亡率上升,细胞的增殖受到抑制;实验组的细胞肿胀,溶解性坏死,仅留细胞轮廓,细胞膜完整性破坏,线粒体空化、肿胀。

KILLING EFFECTS OF PULSED ELECTRIC FIELDS ON MALIGNANT TUMOR CELL

In order to observe the lethal effects of pulsed electric fields (PEFs) of different parameter combinations (frequency, peak value of voltage, width of pulse) on malignant tumor cell, every PEF was applied to malignant tumor cell suspension (3 ml) in the test bottle for 20 min. The MTT method was used to test the mortality ratio of tumor cell and growth curve was plotted. The ultrastructural variations of treated cells were inspected and compared with the untreated cells. The results showed that PEFs of different combinations had great influence on tumor cell. With the increasing of parameter value, the mortality ratio of tumor cell was rising and cell proliferation was inhibited. The treated cell was swollen and the membrane was destroyed. The mitochondria was also cavitated and swollen.

关键词

陡脉冲电场(Pulsed electric fields (PEFs)); 恶性肿瘤(Malignant tumor); 细胞膜(Cell membrane); 不可逆性电击穿(Irreversible electrical breakdown (IREB))