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Cyto-compatibility of NaOH treated PHBHHx film with rat neural stem cell

Hai-xia Lu, Xiao-Yun Lu, Zhi-qian Yang, Yuan-yuan Wang, Qian Jiao, Li Wang and Yong Liu
Xi'an Jiaotong University College of Medicine, China

The success of neural stem cell (NSC) transplantation for brain repair relies heavily on an adequate number of cells surviving the transplant procedure. In recent years Tissue Engineering has emerged as the new hope to address this issue. Here we describe a biocompatible material poly (3-hydroxybutyrate -co- 3- hydroxyhexanoate) PHBHHx which by increasing its surface negative charge enhances both proliferation and differentiation of attached NSC both *in vitro* and *in vivo*. PHBHHx films were treated with 1N NaOH at room temperature for 24 hours to increase the surface charge/hydrophilicity. NSCs isolated from rat cerebral cortex were cultured with the modified PHBHHx films and the complex of PHBHHx-NSC either observed in culture or transplanted into rat brains for 1 week. NSCs attached and survived well on NaOH treated PHBHHx film in medium contain 1% FBS as compared with non-treated films. The self-renewing capacity was well maintained and NSCs preferentially grew into 3 dimensional aggregates. Immunocytochemistry showed that over 60% of the cells were nestin positive ie un-differentiated even after 7 DIV in differentiation medium. After 7 days *in vivo* the NSCs started to migrate towards brain tissue. Exposure to 3 hydroxybuterate (3-H) a degradation product of PHBHHx films showed no toxicity towards the NSC but neuronal differentiation was significantly enhanced accompanied by up-regulation of P-Akt and down regulation of P-Erk1/2. Our results suggest that modified PHBHHx can be used to enhance integration of NSCs both *in vitro* and *in vivo* and therefore shows significant potential for neural tissue engineering.

Biography

Hai-xia Lu got her Ph.D. degree of Neuroscience in 2002 at Xi'an Jiaotong University College of Medicine. She has been a clinical doctor in Department of Obstetrics & Gynecology, The Second Affiliated Hospital of Xi'an Jiaotong University College of Medicine for 11 years and then moved to Xi'an Jiaotong University Health Science Center in 2008. Currently, she is the vice-director of Institute of Neurobiology and focused on Neural Stem Cell research and Brain Repair. She has published more than 20 peer reviewed papers.

hxl01@mail.xjtu.edu.cn