Opinion

The consideration of viral vector in gene therapy to potential lung injury

Abstract

Objection: In preparation for adenovirus vector mediated gene therapy to mouse lung, we studied the adverse effect of it under hyperoxia.

Methods: The mice used in the study were separated into adenovirus vector treated group and control group, each group included 40 mice; the vector with LacZ marker gene was transferred by nasal administration; the location of LacZ marker gene was detected by histochemistry Staining.

Results: LacZ marker genes could express in all area of the mouse lung under hyperoxia and room air situation; the survival time for mice in adenovirus vector treated group was shorter when compared to the control group mice (P value<0.05); the total protein and cells in the mice lung lavage fluid showed an remarkable increasing in the adenovirus vector treated group compared to the control (P value<0.05).

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Introduction

The ideal virus vector for gene therapy is to transfer target gene to a location with effective gene expression; and it should not cause significant toxicity on its own.[1,2] During the study on gene therapy from 2002 at University of Pennsylvania School of Medicine, we observed the first finding of potential lung injure from viral vector delivery to mice. The finding has presented at the American Physiological Society session in the Conference of Experiment Biology (EB) in 2003; for more detail investigation, the results also published in the Journal of American Journal of Respiratory Cell and Molecular biology.[3]

Our researchers transferred adenovirus vector by nasal administration to mice, the adenovirus used for gene therapy was a specific recombinant one which encoded targeted gene in its DNA sequence. Under the situation of oxygen stress, the researchers were primarily interested in better defined the antioxidant role of an enzyme (1-cyc peroxidase) major expressed in lung; well, they found that the adenovirus vector in their experiments had possibility to induce potential lung injury in mice, so it is required to consider of the adverse effect of vector in evaluating the results of gene therapy study, and it is necessary to improve virus vector to avoid the problem for more widely used in gene therapy and clinical future treatment.[4,5]

Results

LacZ marker genes could express in all area of the mouse lung under hyperoxia and room air situation; the survival time for mice in adenovirus vector treated group was shorter when compared to the control group mice (P value<0.05); the total protein and cells in the mice lung lavage fluid showed an remarkable increasing in the adenovirus vector treated group compared to the control (P value<0.05).

Conclusion

Adenovirus vector mediated gene therapy could effectively transfer marker gene into mouse lung by nasal administration under hyperoxia and room air situation; but with potential lung injury; so that, the study implied to consider the adverse effect of virus vector in evaluating the results of gene therapy.

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Conflicts of interest

The authors have no conflict of interests related to this publication and have not received any grants.

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