

유전자 치료와 분자영상의학

Gene Therapy and Molecular Imaging

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Abstract

Gene therapy is a method to treat diseases by delivering genes into target cells. Proteins expressed by the delivered genes or the alterations of the gene profile in and around the target cells provide therapeutic effects. Conventionally, the body distribution of delivered gene or expressed proteins has been quantified by determining the concentrations of the materials of interest in each organ at different time points. This procedure requires sacrifice of a lot of experimental animals and is time - consuming. In addition, the information on the time - dependent changes in a single animal is lost. Molecular imaging technique could potentially provide answers to these problems. The molecular imaging refers to a collection of imaging techniques that enable real - time observation of genes, proteins, and other molecules inside a living body. Magnetic, nuclear, and optical imaging techniques are the most widely used ones to study the biomolecular processes. Many newly developed imaging markers and reporter genes are available to trace genes by a variety of imaging techniques. Along with the anatomical information that the conventional imaging techniques supply, information on the changes at the molecular level provides a deeper understanding on the biological events.

Keywords : Gene therapy; Gene delivery; Molecular imaging; Imaging probe; Non-invasive method

가 (endoge-
neous)

가

가

. PET

^{11}C - choline(CH) 2 -

가 deoxy - 2 - [^{18}F]fluoro - D - glucose(FDG)

luci- (11). sodium iodide symporter(NIS)

ferase green fluorescent protein(GFP)

(6~8).

NIS 가 PET

(12). Tc99m - Tetrafosmin

single photon emission to-

mography(SPECT)

MIT가 10

가

fluorescence imaging

luminescence imaging 가 가

(9).

가 autofluo-

rescence 가 (13).

가 10~100

MRI(magnetic resonanace imag-

ing) CT(computed tomography) cyanine

10 μm micro -

MRI micro CT

. MR 가

. Green fluorescence protein

. Luminescence imaging

(10).

luciferase

(8).

가

1~2 cm

가

가

가

가

가

가

가

Herpes

Simplex Virus thymidine kinase(HSV 1tk) trans-
gene (8). HSV 1tk gancyclovir

DNA . HSV 1tk

FIAU

FHBG

가

가

. Dopa-

mine D2 Receptor Tc99m

human type 2 somatostatin receptor PET

가

. Sodium iodide sympor-

ter(NIS)

uptake

(12).

MR

가

transferrin

가

superparamagnetic

transferrin receptor

가

(14).

3

가

가

가

