

Special Issue ·

핵의학 치료의 최신지견

Recent Advances in Radionuclide Therapy

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Abstract

Radionuclides are naturally occurring unstable atoms that undergo radioactive decay. There are ways of radioactive decay emitting different types of radiation based on their physical properties. Radiation for medical purposes include gamma rays, characteristic X - rays, negative and positive electrons, and alpha particles. Different from external radiotherapy, radionuclide therapy internally delivers therapeutic doses of radiation to the targeted tissue. Historically, P - 32 orthophosphate was used for the management of myeloproliferative disorders. I - 131 has been used for the treatment of hyperthyroidism as well as thyroid cancer for decades. It is one of the most commonly used therapeutic radionuclides in the current practice and its usefulness has been well established by selectively ablating thyroid tissue. For bone pain by osteoblastic metastases, phosphorus - 32, strontium - 89, samarium - 153, or rhenium - 186 could be effectively used in combination with narcotics. Another well known radionuclide therapy is I - 131 MIBG for the palliation of patients with inoperable tumors of neural crest origin. In contrast to systemic administration of radioactive materials, local control of malignant tumors could be done by delivering radiation through an intratumoral or intraarterial route. In addition, radioactive skin patch or stent has a promising role in killing skin cancers, esophageal cancer, or malignant biliary strictures. Recently, I - 131 or Y - 90 conjugated with monoclonal antibodies increases the efficacy of radiation damage to lymphoma tissue employing the targeting effect of monoclonal antibodies. Likewise, radionuclide therapy in combination with gene therapy seems to be promising albeit tumor specific ways of gene delivery should be further investigated. Other possible candidates in radionuclide therapy are radioactive peptides and antisense oligonucleotides.

Key words : Radionuclide; Therapy; Radiation

: ; ;

(radioactive decay)

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가
(particle)

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(par-

(particle),
cle),

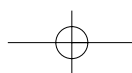
(particle),

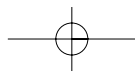
(parti-

(Auger electron)

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가





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1941 Hertz Roberts I - 131

I - 131

가

(1). I - 131

(Radioactive phosphorus) P - 32 or-

I - 131

thophosphate 1936

가 (poly-

cythemia vera)

(myeloproli-

ferative disorder)

가

I - 131

DNA

가

가

I - 131

가

(external radiation)

I - 131

가

I - 131

phosphorus - 32,

strontium - 89, samarium - 153, rhenium - 186

(microscopic metas-

가

tasis)

가

(osteoblastic metastasis)

가

I - 131

I - 131 MIBG(methyl iodobenzyl-

I - 131

guanidine)

MIBG가

가 가

5

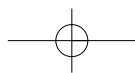
(neural crest)

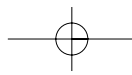
10

I - 131

가

(neuro-





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blastoma) 가

Ho - 166
(patch) 가

Ho - 166
(growth arrest)
가 (4).

가

(2).

(stent)가
(palliative treatment)

(5).

가

가

(synovium)

(radiofrequen-
cy), (laser), (microwave),
가

(6).

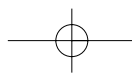
(radioimmunotherapy)
(monoclonal antibody)

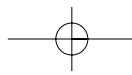
166 가 , I - 131 Ho -

(radioactive
microsphere)

(3).

가





가 가

(differentiation antigen)

가

CD20

가 가

I -

가

131 Y - 90

가

I - 131

Y - 90가

I - 131

(- ray)

(peptide)

(8).

Y - 90

가

가 I -

131

가

Y - 90

CD20

(neuroendocrine tumor)

(Zevalin; IDEC pharma-

(somatostatin)

ceuticals Corp., San Diego, CA)

(octreotide)

가

CD20

In - 111

Y -

70%

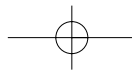
(7).

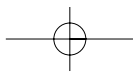
90

가

가

가





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가 .
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가 .

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(oncogene) mRNA
(oligonucleotide)

가

(transduction)

(9).

가 (11). ㉔

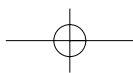
131

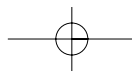
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(vector)가

(10).

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