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Questions and Answers on Guideline for the Nonclinical Studies and the Design of Clinical Studies of Therapeutic Radiopharmaceuticals (Q&A)

2.1 Primary Pharmacodynamics

Q1.	For primary pharmacodynamics studies, what types of test systems are assumed in *in vitro* and *in vivo* studies?

A1. It is assumed that primary pharmacodynamics (and pharmacokinetics and dosimetry for *in vivo* studies) can be evaluated *in vitro* by studies using human cultured cells or others, and *in vivo* by studies using mice grafted with human cancer cells or rheumatoid tissues, or others.

2.3 Pharmacokinetics

Q2.	For pharmacokinetic studies, what are the points to consider when selecting and using alternative radionuclides to the radionuclides in an active ingredient of therapeutic radiopharmaceuticals?

A2. Alternative radionuclides to the nuclides in an active ingredient of therapeutic radiopharmaceuticals should be selected on the basis of the similarity of their element characteristics, and the applicant must justify the substitution.

2.5.7 Impurity Assessment

Q3.	Even when a trace mass dose in microgram (μg) units is administered to humans, are the reporting, identification, and safety evaluation of impurities required to be performed?

A3. Basically, assessments are required to be made. At the same time, for anticancer pharmaceuticals, some assessments and studies may be omitted by reference to the ICH S9 guideline.