



国家质量监督检验检疫总局

General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China



APLMF 19th Meeting

Report from Working Group on Metrological Control System (MCS)

Presented by
Yang Youtao
P.R. China



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Outlines

- **1 Guide lines for APLMF**
- **2 Questionnaire for Ionizing Radiation Metrology**
- **3 Guide lines of “Ionizing radiation metrology for human health and security in medicine on legal metrology system”**
- **3 Associated with the WG on Medical Measurements**



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- **OIML recommendations for the universal apparatus of Metrology**



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- **Carry out the OIML recommendations unquestionably**
- **Focus on Some apparatus of Metrology that involved the safe and Health of people**



2 Questionnaire for Ionizing Radiation Metrology

- Has the ionizing radiation medical metrology been brought into legal metrology system in your economic ?**
- Did your economic have relative laws or documents about medical ionizing radiation metrology?**
- Did your economic attach importance to the ionizing radiation metrology in human health and security in medicine?**
- Is it necessary to draft the guide line of The application guide of Ionizing radiation metrology for human health and security in medicine under legal metrological system ?**



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- **Investigate and survey for some apparatus which used in the fields of safe & health sides.**
- **Associated with the WG on Medical Measurements & Chinese Taipei Bureau of Standards, Metrology and Inspection (BSMI)**



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- **Draft a guide lines of “Ionizing radiation metrology for human health and security in medicine on legal metrology system**
- **APLMF recommend it to OIML**



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The guide line for Ionizing radiation metrology for human health and security in medicine on legal metrology system



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- Ø Medical X ray diagnosis
- Ø Clinical nuclear medicine
- Ø Radiation oncology

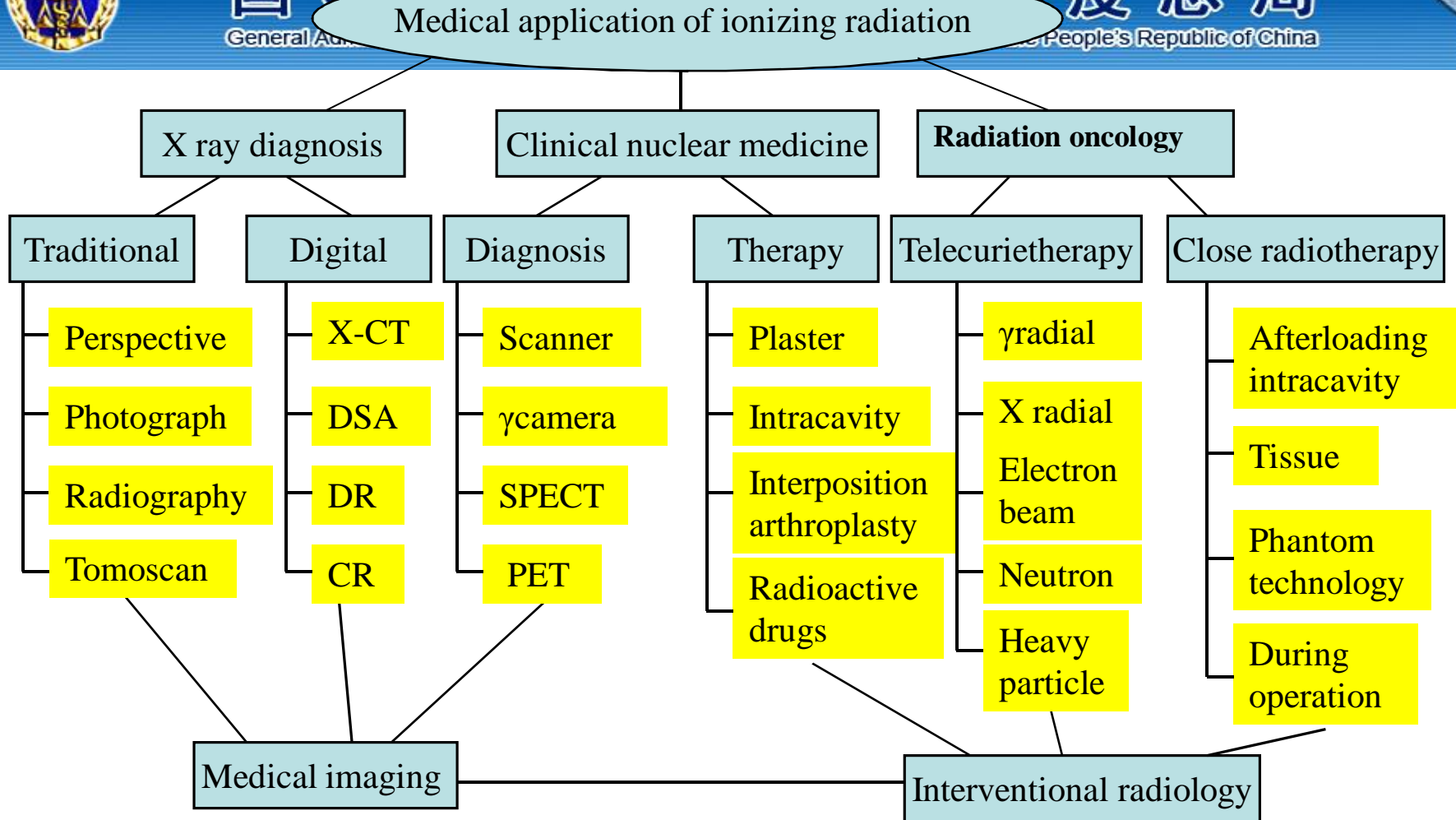


Diagram of ionizing radiation application in medicine

Note: X-CT is X ray computer tomography apparatus; DSA is digital subtraction angiography; DR is digital photography; CR is computer photography; SPECT is single photon emission computed tomography imaging device; PET is positron emission computed tomography device



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CT computed tomography





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PET_CT

Positron Emission Tomography





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Medical processing accelerator





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How to use ionizing radiation reasonably?

The accuracy of ionizing radiation equipments



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**Ensure the traceability of dose of medical ionizing radiation,
the legal metrology management must be carried on**

Ensure the value in radiotherapy uniform and accurate



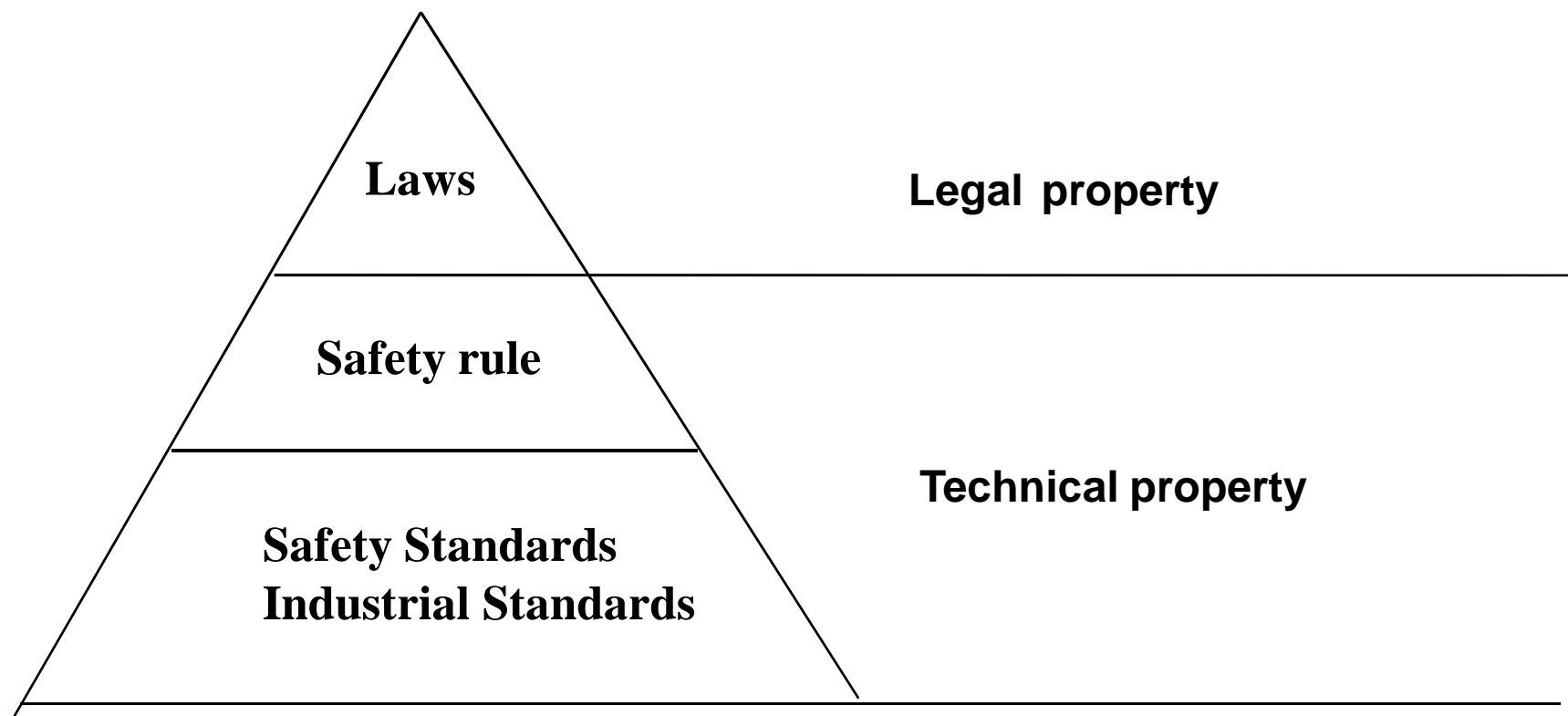
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Laws: guarantee to bring radiation metrology into legal management

Standards: scientific bases to develop radiation protective surveillance and evaluation





General

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Basic standards for protection against ionizing radiation and for the safety of radiation sources.

CT :

Ø IEC 60601-2-44

PET-CT :

Ø DIN 6855-4-2004



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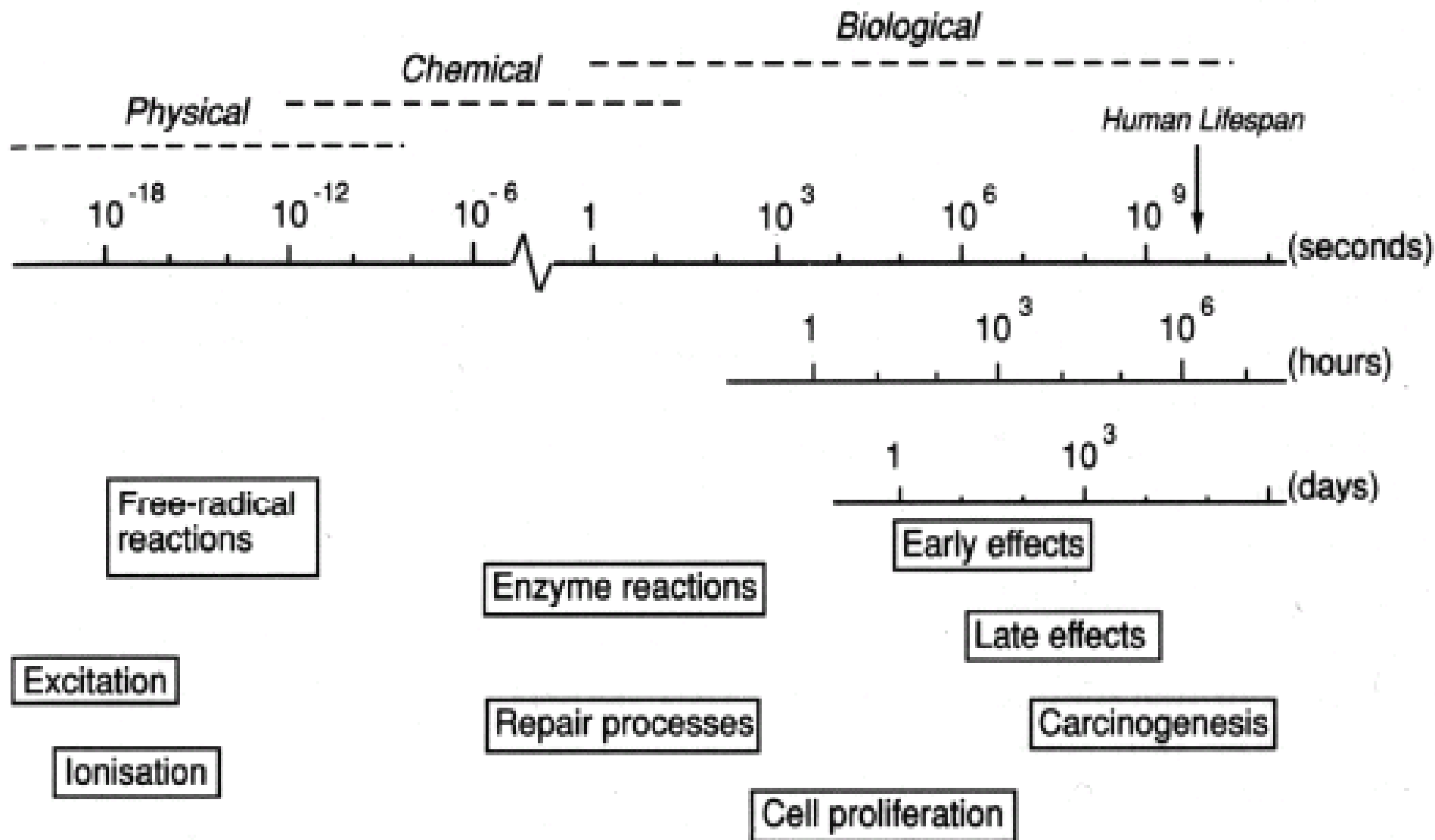


Ionizing radiation release energy in human body

Effects of Chronic irradiation includes: DNA variation,



Biological effect process of radiation with time scales

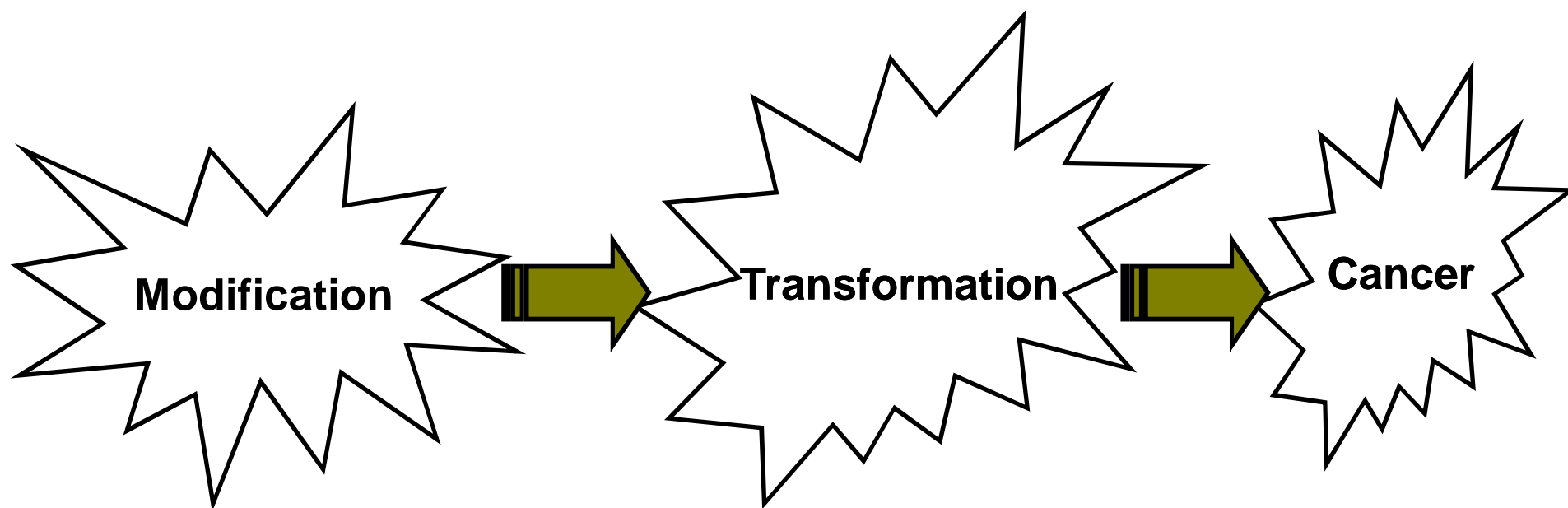




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Injury in cell level





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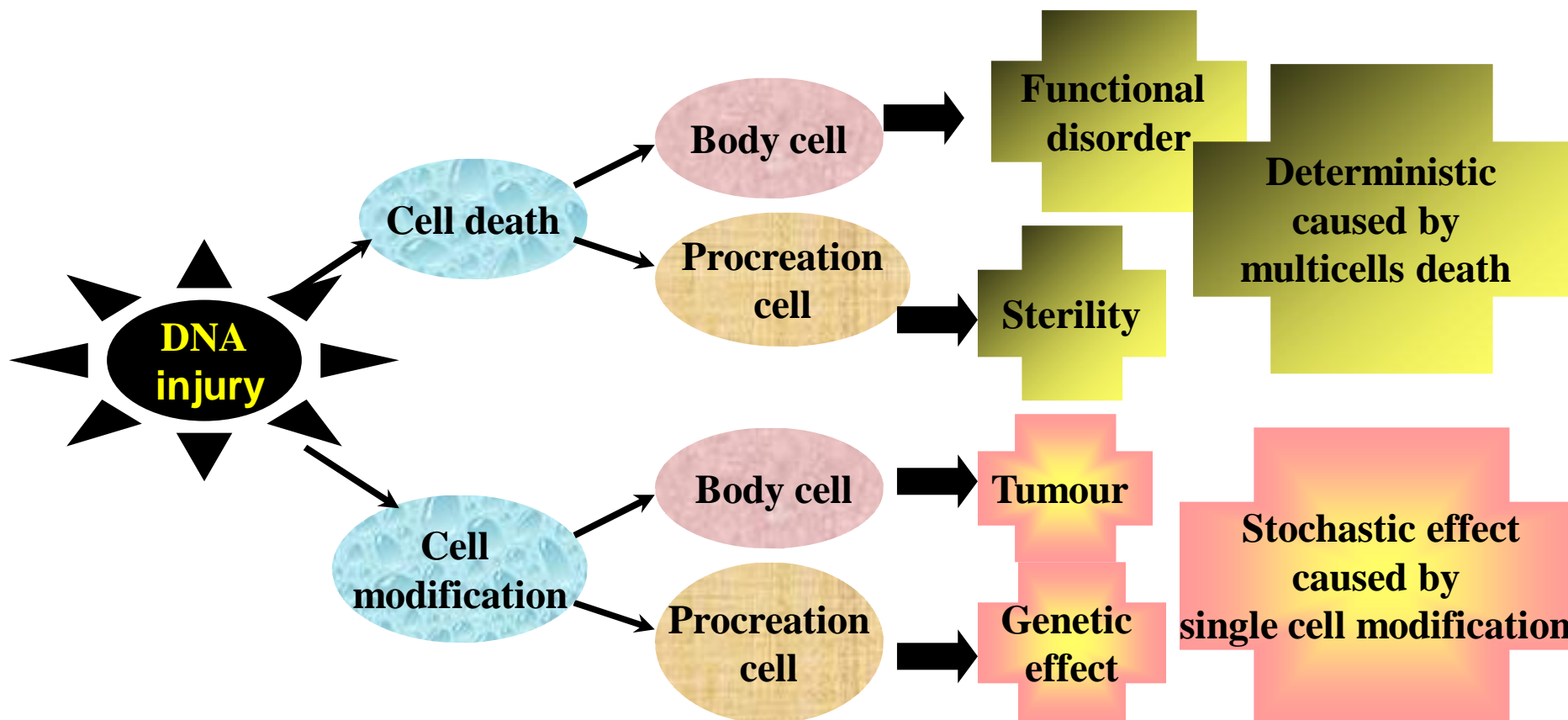


Molecule level

Cell level

Clinical symptom

Effect





Major accidents caused by inaccurate metrology in radiotherapy

Country	Date	Injured patient	Possible reason
America	1974-76	450	Draw ^{60}Co attenuation curve falsely
Germany	1986-87	86	Calculate dose of ^{60}Co for treatment plan falsely (overdose mostly)
Britain	1988	207	Calibrate ^{60}Co ray bundle falsely (25% overdose)



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Radiation injury induced by Radiotherapy and CT



Consequence of accidents



20. Patient B (Day 26); mouth sores; Patient A had similar sores.





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Consequence of accidents





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Consequence of accidents





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《The application guide of Ionizing radiation metrology for human health and security in medicine on legal metrology system》

- Ø Preface
- Ø Summary
- Ø Concepts and terminology
- Ø Standards, measurement method and measurement traceability
- Ø testing laboratory requirements



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The guidelines aimed to provide guidance for metrology of ionizing radiation in medical application



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Thank you for your Attention!

