

Comparison of Cytogenetic Aberration Assays Used for Dose Assessment^a

	Premature Chromosome Condensation (PCC)	Dicentric Chromosome Assay (DCA) and Ring Chromosomes	Fluorescent <i>in situ</i> hybridization (FISH)	Cytokinetic block micronucleus assay (CBMN)
Description of typical assay scored for biological dosimetry	Excess chromosome fragments; dicentrics ^b and rings translocations ^b	Dicentrics ^b and rings	Dicentrics ^b and rings	Micronuclei
Typical radiation scenario applications for this assay	acute recent exposure	acute protected recent exposure	acute protected recent exposure	acute protected recent exposure
Photon equivalent, acute dose range (Gy) for whole-body dose assessment	0.2 to 20	0.1 to 5	0.25 to 4	0.3 to 4
Useful for partial body exposure application?	Yes	Yes	NA ^c	NA
Useful for triage dose assessment?	Yes	Yes	NA	Yes
Status of assay standardization	NA	ISO standards ^{d,e}	NA	ISO standard pending ^f

^a Table adapted from 2 monographs:

--[Cytogenetic Dosimetry: Applications in Preparedness for and Response to Radiation Emergencies](#) (IAEA, PAHO, WHO, September 2011)

--[Triage, Monitoring and Treatment - Handbook for management of the public in the event of malevolent use of radiation](#) (TMT Handbook Partners)

^b Specific chromosome aberrations typically detected by use of centromeric and whole-chromosome specific DNA hybridation probes.

^c NA: not application/not available

^d [International Organization for Standardization, Radiation Protection-Performance Criteria for Service Laboratories Performing Biological Dosimetry for Cytogenetics, ISO 19238](#), ISO, Geneva (2004)

^e [International Organization for Standardization, Radiation Protection-Performance Criteria for Service Laboratories Performing Cytogenetic Triage for Assessment of Mass Casualties in Radiological or Nuclear Emergencies-General Principles and Application to Dicentric Assay, ISO 21243](#), ISO, Geneva (2008)

^f Fenech M, et al., [HUMN Project: detailed description of the scoring criteria for the cytokinesis-block micronucleus assay using isolated human lymphocyte cultures](#), Mutat Res 2004; 534: 65-75