

Biological Dosimetry for Occupational Overexposure: Changes in Operation Concept

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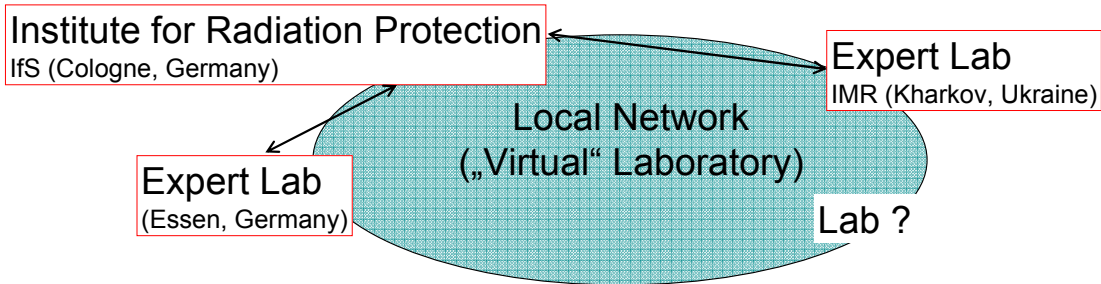
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The most of radiation accidents take place in occupational field. Cytogenetic biodosimetry (BD) is a powerful tool both for monitoring occupational groups and for management of real or suspected events. From the other hand radiation accidents are rare and for economic reasons it is not always possible to keep running biodosimetry laboratories in radiation protection institutions.



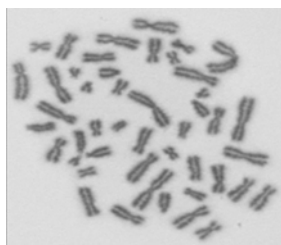
We suggested and applied the additions to the concept of biodosimetry service that becomes possible with modern technology. The idea was to bring together the international expertise of radiation protection institution and cytogenetic laboratories in order to create a “virtual” laboratory for biodosimetry of suspected occupationally caused overexposure.

Pilot study of microscope and image analysis intercomparison

	German Professionals				Ukrainian Uranium Miners *)			
	Images analysed	Cells scored for chromosome aberrations	chromosome type aberrations	Dicentrics	Images analysed	Cells scored for chromosome aberrations	chromosome type aberrations	Dicentrics
Microscopy analysis	—	838	1,67%	0,48%	—	989	11,02%	6,47%
Image analysis	3.683	1.709	1,70%	0,47%	1.761	632	8,86%	5,06%

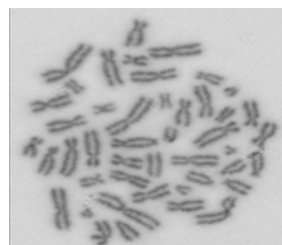
*) Some of donors undergone radiation therapy for cancer treatment

Examples of metaphases with various damaged status



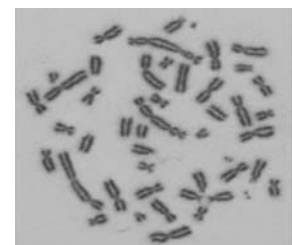
a)

a) normal cell



b)

b) cell with 1 dicentric



c)

c) heavily damaged cell with several dicentrics

REQUIREMENTS and ADVANTAGES for suggested BD service

- The connections between institutions have to be established prior to accidents
- The image capturing system is a must have.
- Applying of QA/QC procedures and intercomparison exercises to minimize the interlaboratory variability
- Flexibility for radiation protection institutions in building up BD service considering their needs
- Possibility for inviting additional international experts
- All the benefits of ready-to-use BD service.

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