

### Early and Retrospective Chromosomal Dosimetry in Chernobyl Clean-Up Workers

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After Chernobyl accident, the cohort and individual dose estimations for various groups of exposed population were of great importance. The biological dosimetry based on chromosome aberrations study was the technique of choice for evaluating radiation exposure in persons who took part in clean-up activities in post-critical and following periods (liquidators). For the subsequent part of liquidators' group the additional task for biodosimetry was verification of radiation doses registered in military or other official documents. Cytogenetic investigations in liquidators started in our institute clinic less than one month after the accident. The biodosimetry was based on dicentric plus centric rings yields referred to an acute in vitro Co-60 dose-response curve, modified considering exposure protraction. The conventional cytogenetic analysis was performed in 100 liquidators with registered radiation doses ranged from 17 to 1030 mGy (in 45 persons - 250 mGy) during the first year after exposure. The negligibility of the aberrant cells elimination during the mentioned post-irradiation period was shown when the follow-up cytogenetic effects were investigated. For the comparison of documented doses with biological estimations several mutually additive approaches of data treatment were applied. The individual data were pooled according to the registered dose in narrow dose intervals. The moderate positive correlation between the registered doses and mean dicentric yields was shown for some particular groups. Biologically estimated doses exceeded the documented means in most of dose groups; in total group the average biological dose was about twice higher than the average registered one. The theoretical distribution of individual aberration frequencies based on the registered doses was constructed and that appeared to be significantly different from the really observed data. Applying the Bayesian analysis allowed to make the quantitative assessment of the consistency between registered doses and real levels of radiation exposure. Retrospective FISH-biodosimetry was performed for liquidators 10-14 years after exposure in Chernobyl. For dose assessment the yield of stable chromosome exchanges in "stable" cells with full presence of chromosomal material was used. The mean yield of stable chromosome exchanges didn't correlate with registered doses but had a negative dependence on the duration of liquidators' staying in Chernobyl, FISH-based biodosimetry provided mean group dose estimations of 390 mGy in liquidators that was in good agreement however 15 % lower comparing with those obtained with conventional analysis soon after irradiation. The comparison of dicentric and FISH biodosimetry and various approaches of data treatment for the cohort and individual biodosimetry are discussed.