Expansion of Human Male Infertility on Radiation Polluted Territories of Ukraine

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Light microscopic examination of semen is routinely applied for the diagnosis of male infertility. However the limitations of such analysis are well recognized. Therefore flow cytometry (FCM) which allows for the simultaneous measurement of several biological characteristics at the single cell level in several thousands of cells may serve a complementary approach for rapid identification of sperm chromatin and membrane disturbances. The present research aims in evaluation quality and fertility potential of sperm collected from donors originating from radiation-polluted territories of Ukraine. In this connection the role of radiation component in sperm damaging was assessed. Freshly ejaculated semen was obtained by masturbation after 3 days of sexual abstinence. Ejaculates were allowed to liquefy at 37 °C for 30 min. Then sperm motility, morphology and concentration were analyzed by light microscopy in accordance with WHO protocol. The other parameters, namely apoptosis development (AD), mitochondrial membrane potential -$\Delta\psi_{\mathrm{m}}$ were determined on flow cytometer PAS (Partec, Germany). AD was followed by Annexin V - Apoptosis detection Kit I (BD Pharmingen, USA) including Annexine V-fluorescein isothiocyanate which visualizes phosphstidylserine translocation from the inner to the outer leaflet of the plasma membrane. $\Delta\psi_{\mathrm{m}}$was measured by means of Rhodamin 123 dye. DNA ploidy was quantified using propidium iodide staining. The data received have shown the existence of specific correlations between the radiation dose accumulated by donors and the quantitative distribution of spermatozoa on subpopulations of apoptic, necrotized, immobile and viable cells. Furthermore the increase of sperm DNA aneuploidy and DNA fragmentation reflected the tendency for infertility growth.

Article published by EDP Sciences and available at http://www.radioprotection.org
or http://dx.doi.org/10.1051/radiopro:2008565