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HUMAN SEMEN AS AN EARLY AND RELIABLE TOOL OF ENVIRONMENTAL IMPACT ASSESSMENT ON HUMAN HEALTH: ECOFOODFERTILITY PROJECT

Statement of the Problem: Several studies have shown a dramatic reduction of male fertility in many industrialized countries and infertility is becoming a top priority for the public health. A pilot biomonitoring study of EcoFoodFertility Project a multicenter, multidisciplinary research connecting human life-style and dietary habits to the environmental consequences of exposure to pollutants, was conducted in Campania region (Italy) on a cohort of clinically healthy male residents in “Land of Fires” (high environmental impact- HEI) compared with a similar cohort living in the rural area of the same Region, Alto-MedioSele (low environmental impact–LEI).

Methodology and Theoretical Orientation: 110 healthy males were recruited from HEI and LEI areas (age 28±5years). Enrollment criteria were no smoking, no habitual alcohol drinking and no occupational exposure. In both semen and blood we analyzed 22 trace elements by optical emission spectrometry and total antioxidant capacity (TAC) by spectrophotometry. In a randomly subset of 20 subjects from each group, we analyzed sperm DNA fragmentation index (DFI) by Sperm Chromatin Dispersion test and antioxidant enzyme activities in the semen (Glutathione reductase, Glutathione peroxidase) by spectrophotometry.

Findings: HEI subjects showed significantly higher values ($p < 0.05$) for Al, Mn, Cr, Mg, Li, Co, Ca in blood, as well as for Cr, Cu and Zn in the semen, while Fe was lower in the semen of HEI-group ($p < 0.05$). Immotile sperms and the DFI were both higher ($p < 0.026$ and $p < 0.01$, respectively) in HEI-group. TAC in blood showed no differences, while TAC, GSR and GpX in the seminal plasma were significantly lower in the HEI-group ($p < 0.05$). The percentage of immotile sperms showed significant ($p < 0.005$) inverse correlations with both TAC and GSH in semen.

Conclusion & Significance: These results suggest sperm motility, DFI, antioxidant capacity, chemical element pattern are influenced by high environmental pressure and human semen could be used as an early and reliable tool of environmental impact assessment on human health, useful for innovative prevention programs and health surveillance in risk areas.

Biography

Luigi Montano, UroAndrologist, has his expertise in Environmental Pathology and his interest is focused on the reproductive health in high environmental risk areas. In fact, he is the creator and Coordinator of EcoFoodFertility project a multicenter, multidisciplinary research connecting human life-style and dietary habits to the environmental consequences of exposure to pollutants with the aim of: 1. Developing a better understanding of the environmental impact of pollutants on healthy humans in areas with different environmental impacts; 2. Use human semen as an early and sensitive biomarker of environmental exposure to pollutants; 3. Identify dietary approaches and/or detoxifying therapy in order to improve the human semen quality in healthy men who living in polluted areas. The project is starting up in several environmental risk areas of Italy and draw up a new model of research for Environmental Impact Assessment and for Primary Prevention of Risk Areas.

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