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Development of nuclear safety and radiological protection methods for the nuclear power engineering's current and future needs.

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The strategic research project entitled "Technologies Supporting Development of Safe Nuclear Power Engineering"is a response to the demand for the Poland's energetic safety optimization in the light of nuclear power engineering introduction. The strategic project will link research performed by Polish research teams with that which is carried out abroad and provide Polish scientists and experts specialized in nuclear industry with training opportunities. Its implementation shall contribute to the solution of problems posed by spent nuclear fuel and radioactive waste. In addition, the project shall lead to the adoption of legal and factual regulations on radiological protection, which, in its turn, will result in the increased social appreciation of the nuclear power engineering expansion in Poland.
Task nr 6 of the project entitled "Development of nuclear safety and radiological protection methods for the nuclear power engineering's current and future needs"is implemented by research network comprises Institute of Nuclear Chemistry and Technology, National Centre for Nuclear Research, Institute of Nuclear Physics Polish Academy of Sciences and Central Laboratory for Radiological Protection as the research network leader.
One of the objectives of the project is to develop bioassays based on molecular biomarkers that can identify radiation-exposed individuals and that can provide individual radiation dose assessments to enable triage and optimal medical management. To this end we analyzed the expression of DNA damage responsive genes in ex vivo irradiated whole blood from three healthy donors. Analyzed genes were as follows: GADD45A, CDKN1A, MDM2, BBC3, SESN2, BAX, DDB2, ATF3, PLK3, GDF15 and BCl2. Blood was X-irradiated with a doses of either 0 Gy; 0,6 Gy; or 2 Gy and gene expression was measured by real-time PCR at 6, 12, 24, and 48 hours after irradiation. The preliminary data suggest that the analysis of expression profiles of the selected genes in whole blood may be very useful for fast identification of irradiated samples and therefore is a promising molecular biomarker for radiation biodosimetry.
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