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GUEST EDITORIAL

Biological Radioprotection: Six Decades of Scientific Struggle!!

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Welcome to this special issue on 'biological radioprotection' of Defence Life Science Journal (DLSJ). The journal is published by Defence Scientific Information & Documentation Centre (DESIDOC) on behalf of Defence Research and Development Organisation (DRDO), Govt. of India. Biological radioprotection is an uncherris goal for radiation biologist at global scale. Despite six decade's continuous efforts, global scientific community is still searching for a radiation countermeasure agent which can be used during radiation emergency scenario. Though, few radioprotective agents received IND status by US-FDA however, so far not a single drug is approved for human uses globally. The major obstacles to achieve biological radioprotection are i.e. variable severity of biological damage with different types of radiation and dose rate, differential RBE for low LET and high LET radiation, variable radiosensitivity of biological systems, unpractical time and drug therapeutic dose window and unacceptable toxicity at efficacious dose of a radioprotective agent, etc. Despite serious efforts, till date no drug molecule was qualified at all ideal parameters to achieve biological radioprotection. India is a declared nuclear state, and military grade radioactive fuel enrichment process is always prone to accidents. India enhancing its capabilities in the area of nuclear energy increases the probability of accidental radiation release as evident in the past in USSR (Chernobyl, 1986) and Japan (Fukushima, 2011). Apart from that, being huge medical diagnostic and therapeutic pressure, installations of gamma irradiators, X-ray machines, CT scanners and PET scanners are increasing in hospitals, further complicating the situation and alarming us for possible radiation incident/accident in future anywhere in the world. Past history is full of nuclear incidents/ accidents in military as well as civilian establishments and nobody can ensure desired level of safety and protection against future nuclear accidents. Nuclear terrorism is another dimension of immediate attention. Radiological dispersal device (RDD) detonation, dirty bomb explosion by non state actors or even nuclear attack by enemy states cannot be ruled out completely. In view of above, development of effective, nontoxic and approved radiation countermeasure is the need of hours but unfortunately it is not available anywhere in the world.

During mass casualty scenario, radiation biodosimetry is another dimension of the medical management of radiation injuries. Radiation biodosimetry provides an estimate about the absorb radiation dose in the exposed individual. Presently, IAEA approved method (chromosal dicentric assay) of biodosimetry is not instant and thus unable to handle more number of samples in shortest period of time for triage management of radiation exposed persons. Therefore, other approaches need to be adopted to develop high-throughput radiation biodosimetry methods. Several approaches like, proteomics, genomics, metabolomics is being under investigational stage to identify radiation specific biomarker for triage application.

Considering both dimensions i.e. radioprotector development and radiation biodosimery, present special issue on biological radioprotection was planned. Highly focussed articles from eminent researchers from India and abroad working in the area of radioprotector development and radiation biodosimetry were selected and accepted for publication in the present issue. Issue includes original research articles and reviews covering various basic and applied aspects of biological radioprotection. This issue includes a variety of article including plant based radioprotectors, bacterial compound, synthetic molecules and stem cell based approaches for radioprotector development. Similarly in radiation biodosimetry, articles dealing with radiation metabolomic biomarker, proteomics biomarkers, microfluidic devices and cytogenetic based approaches are included. All selected articles and review papers find their place in this issue was approved on the basis of independent peer reviews by the experts of the area from India and abroad.

It is an honour for me to contribute as a guest editor of the present issue of DLSJ. I also appreciate the authors, co-authors and expert reviewers from India and abroad for their excellent contribution for this present issue of DLSJ. I would also like to thank Editor-in-chief, editorial board and editorial team of DLSJ for their great support and co-operation to make it possible to publish the special issue of DLSJ. I also extend my thanks to Dr A.K. Singh, Director INMAS whole hearted support for the issue.

I hope the content of the issue will provide a valuable input to our readers and researchers alike. I request to our reader community to share their ideas and views to improve the quality of journal and its circulation beyond boundaries. Finally, I also request to the research community especially from defence life scientists across the world, kindly contribute/ submit their research work in the Journal.