

**Dr. Ram Sagar Misra**, Assistant Professor, Department of Chemistry receives Extra Mural Research Funding (Individual Centric) from DST.



**Dr. Ram Sagar Misra**, Assistant Professor, Department of Chemistry receives Extra Mural Research Funding (Individual Centric) from Science and Engineering Research Board (SRRB), Department of Science and Technology (DST), Government of India. He has been awarded the grant for research work on *“Towards chemical synthesis of linear Poly(ADP-ribose) for bio-application”*

DNA as a holder of genetic information is of a crucial importance for all organisms. However, a number of agents are capable of damaging the genome and therefore there are several mechanisms developed in order to prevent damaging or recognize and repair the damage.

According to much evidence, the nuclear enzyme PARP-1 participates in the reparation and the transcription of DNA. It specifically recognizes and binds to DNA single-strand breaks which cause the synthesis of polymers of ADP-ribose from  $\text{NAD}^+$  and transfer them to specific acceptor proteins. Besides that, there are at least eight more known and complex biological functions of poly(ADP-ribose) polymer in cells Those are

- PARP-1 has been implicated in DNA repair and maintenance of genomic integrity;
- regulates the expression of various proteins at the transcriptional level;
- regulates replication and differentiation;
- poly(ADP-ribosylation) has been implicated in the regulation of telomerase activity;
- PARP-1 activation has been proposed to represent a cell-elimination pathway through which severely damaged cells are removed from tissues;
- poly(ADP-ribose) polymer has been recently identified as an emergency source of energy used by the base-excision machinery to synthesize ATP;
- similarly to ubiquitination, poly(ADP-ribose) may also serve as a signal for protein degradation in oxidatively injured cells;
- in addition to PARP-catalyzed covalent poly-(ADP-ribosylation), poly(ADP-ribose) polymers can noncovalently bind to specific  $(\text{ADP-ribose})_n$  binding motifs in proteins, such as histones, XRCC1, p53, and DNA polymerase  $\epsilon$ , and thereby modify their function;
- poly(ADP-ribosylation) may also be involved in the regulation of cytoskeletal organization.

Talking about the objectives of his project, Dr Ram said, “Our goal in this project is to understand the mechanism of reparation of DNA by using synthetic analogues of poly(ADP-ribose). Long term goal in this project is to design and synthesize molecules that may eventually inhibit PARP1 and cure some metabolic or genetic disorders including cancer.”

For more information about his research please his website:

[http://snu.edu.in/naturalsciences/Ram\\_Sagar\\_Misra\\_profile.aspx](http://snu.edu.in/naturalsciences/Ram_Sagar_Misra_profile.aspx)