Past Research Projects

Title: *Role of TET2 in the Pathogenesis of Acute Myeloid Leukemia*
Funding: ICMR – Research Associate Fellowship
Summary: This project focused on understanding the role of the TET2 gene in the pathogenesis of Acute Myeloid Leukemia (AML). TET2, a critical epigenetic regulator, plays a significant role in DNA demethylation processes by converting 5-methylcytosine to 5-hydroxymethylcytosine. Mutations or dysregulation in TET2 have been linked to hematopoietic malignancies. The study examined TET2 mutations, their impact on gene expression, and downstream effects on haematopoiesis and leukemogenesis. This research also explored therapeutic approaches targeting the TET2 pathway, potentially contributing to the development of novel treatment strategies for AML.
Publications: The project resulted in three publications: one review article detailing the role of TET2 in hematologic cancers and two original research articles that provided novel insights into TET2-associated epigenetic dysregulation and AML progression.

Ongoing Research Projects

1. Title: *To Characterize Gelsolin Gene Expression and Its Impact on Inflammatory Pathways and Survival Outcomes in Patients of Acute Myeloid Leukemia*
Funding: AIIMS Intramural Research Grant (₹10 Lakh for 2 years)
Summary: This study investigates the differential expression of the gelsolin gene (GSN) in AML patients and its role in modulating inflammatory pathways and survival outcomes. Gelsolin, a multifunctional actin-binding protein, exists in cytosolic and secretory forms and plays an important role in apoptosis, inflammation, and cancer progression. Preliminary findings suggest aberrant expression of gelsolin in AML. This project aims to:

1. Quantify cytosolic and secretory gelsolin levels in AML patients and healthy controls at mRNA and protein level.
2. Correlate GSN expression with clinicopathological features, including survival outcomes.
3. Identifying key pathways altered in low and high gelsolin expressing patient population
   This research could lead to potential biomarkers for prognosis and novel therapeutic targets.

2. Title: *A Study of the Impact of TET2 Promoter Methylation on TET2 Expression in AML Patients and the Effect of Epigenetic Modifiers in Cell Lines*
Funding: AIIMS Collaborative Interdisciplinary Research Grant (₹10 Lakh for 2 years)
Summary: Building upon previous research on TET2, this project examines the role of TET2 promoter methylation in regulating its expression in AML. Aberrant DNA methylation in the TET2 promoter may contribute to its dysregulation in AML. The study involves:

1. Assessing promoter methylation patterns in AML patient samples.
2. Correlating methylation levels with TET2 expression and disease characteristics.
3. Investigating the effect of epigenetic modifiers (such as demethylating agents and histone deacetylase inhibitors) on TET2 expression in AML cell lines.
   The findings will enhance our understanding of TET2-mediated leukemogenesis and guide the development of targeted epigenetic therapies for AML.

Both ongoing projects aim to unravel critical molecular mechanisms underlying AML progression, offering potential for translational applications in prognosis and therapeutic intervention.