Details of a few research projects -

1. **Comparison of QTc interval , QRS duration and JTc interval to predict repolarisation abnormality in intra-ventricular conduction disturbance patients – a study conducted in Medical College Kolkata –**

   The QTc interval, which is prolonged in cases of intraventricular conduction defects, is typically a result of depolarisation abnormalities (prolonged QRS) rather than repolarization abnormalities. In the presence of bundle branch blocks, the JTc interval is the best predictor of repolarization abnormalities. This study shows that patients with left bundle branch block (LBBB) have significantly longer QTc and QRS intervals compared to those with right bundle branch block (RBBB).

2. **Evaluation of NADPH Oxidase (NOX) Activity by nitro Blue Tetrazolium (NBT) Test in SLE Patients**

   The present study showed that lupus patients produce more ROS on stimulation than healthy controls. Basal ROS generation was also significantly higher in patients with high disease activity than those with low disease activity. Further studies are needed to explore the mechanisms underlying the increased neutrophil oxidative metabolism and its immunologic consequences in the pathophysiology of systemic lupus erythematosus.

3. **Autoantibody Clustering in Systemic Lupus Erythematosus–Associated Pulmonary Arterial Hypertension –**

   Systemic lupus erythematous–associated pulmonary arterial hypertension (SLE-PAH) is one of the important causes of mortality in lupus patients. Different autoantibodies are associated with SLE-PAH which can predict its future development. The objective of the study was to identify distinct autoantibody-based clusters in SLE-PAH patients and to compare demographic characters, clinical phenotypes, and therapeutic strategies across the clusters. Three distinct autoantibody clusters were identified using k-means cluster analysis in 71 SLE-PAH patients. Cluster 1 had predominant Sm-RNP, Smith, SS-A association; Cluster 2 had no definite autoantibody association; and Cluster 3 was associated with nucleosome, histone, dsDNA, and ribosomal P protein. Patients in cluster 3 had a highly active disease while those in cluster 1 had significant cytopenia. Mean age and mean right ventricular systolic pressure (RVSP) were both high in cluster 2, indicating later-onset PAH in this group. This was the first autoantibody-based cluster analysis study in SLE-PAH patients in India which confirmed that autoantibodies did exist as clusters and the presence of definite autoantibodies can predict future development of pulmonary hypertension in these patients.