**Genetic, Epigenetic and Precision Medicine of Human Autoimmune Disease**

In the past decades, etiology, susceptibility and pathology of autoimmune diseases have been significantly enhanced by molecular epidemiological and GWAS research. Take rheumatoid arthritis as an example, genetic susceptibility of HLA-DRB1 interacted with citrullination-modified calreticulin or vimentin, mediated by PTPN22 and PADI4, caused by environment triggers such as smoking and/or infections initialized the activation of immune system and further inflammatory reactions. On the other side, epigenetic changes were also observed in immune cell (CD4+ and CD8+ T-cells) and synovial cells, especially DNA methylation in HLA and immune-related gene regions, such as interferon-related genes regions. Recently multi-omics research and single-cell based research (single-cell RNA-seq etc) provide more details to autoimmune diseases, such as novel T-cell, B-cell and fibroblast subtypes were involved in the pathogenesis of autoimmune disease. Although we still do not have drugs to completely cure autoimmune disease, immunotherapy have provided promising solution to control the progress of autoimmune disease, such as TNF-α inhibitors and  interleukin-6 receptor (IL-6R) blocker to rheumatoid arthritis. What’s more, Pharmacogenomics have successfully identified serials of genetic markers to predict the drug response, toxicity and adverse events, which provided excellent model for personalized and precision medicine. However, we do require more understandings to subtypes of autoimmune disease, to identify novel susceptibility and pathology related variants for better precision medicine for autoimmune diseases.

With this Research Topic, investigators can contribute with Original Research articles, Review articles, as well as clinical studies that will stimulate the continuing efforts to the understanding of personalized and precision medicine to autoimmune diseases. The following topics, but not limited to them are welcomed in the present topic research section:

1. Identification and evaluation to Novel genetic and epigenetic biomarker for autoimmune diseases
2. Reviews on latest findings with multi-omics molecular analysis to inflammatory and autoimmune diseases
3. Understanding GWAS identified significant SNPs with Epigenetic modifications regulation mechanism.
4. Genetic and epigenetic interaction in the pathology of autoimmune diseases.
5. Review how to understand epigenetics in precision medicine to autoimmune diseases
6. Genetic and Epigenetic difference between different autoimmune diseases, such as SLE, RA, AS
7. Genetic or Epigenetic biomarker or prediction models for drug therapy response or outcomes.
8. Bioinformatics studies to integrate recent GWAS, EWAS, eQTL and molecular pathway works to illustrate susceptibility, etiology and pathology of autoimmune disease.
9. Novel subtype identification to autoimmune diseases based on genetic, epigenetic, cellular features.
10. Cell-free circulating DNA research on autoimmune diseases
11. Pharmacogenomics research for precision medicine to autoimmune diseases in toxicity, adverse events and drug response.

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