POTENTIAL ROLE OF CHROMOSOME X-LINKED MIRNAS IN GENDER BIAS OF SARS-COV2 PNEUMONIA

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Recent reports indicate gender differences in clinical outcomes for coronavirus disease 2019 (COVID-19). Infected men have more severe disease and higher mortality compared to infected women and this linked to an excessive inflammatory response. Currently, the mechanisms underlying this sexual dimorphism are poorly understood. Several physiological factors appear to be involved such as sexual hormones and sex-specific genetic architecture. It is worth noting that sexual dimorphism in infectious diseases were observed at different ages, including pre-pubertal children, hence the prominent role of the X chromosome-linked genetic architecture.

One of the X chromosomes is inactivated in females to ensure an equal X-linked genes expression with males. However, about 15% of X-linked genes escape the inactivation process. This may lead to differential expression of X-linked genes between males and females. Interestingly X chromosome is enriched in micro-RNAs (miRNAs), a small non-coding RNA that regulates gene expression at post-transcriptional level. miRNAs have emerged as important regulators of many biological processes including immunity and inflammation. The potential role of miRNAs in the sexual dimorphism of the immune inflammatory response is yet to be elucidated. We hypothesize that X-linked miRNAs may have a role in fine tuning sex differences in the type and magnitude of the immune response and may therefore impact the outcomes in COVID-19.