**Title:** Sex-Linked Differences in Lung Adenocarcinoma (LUAD)

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**Abstract:**

It's a known fact that males and females exhibit diseases differently. However, there's still very little research on why this is true. Most studies about diseases or the effects of treatments don't take sex into account if they even include women in these studies at all. In order to study the difference between males and females, we need to look at the processes that regulate gene expression. This study aims to further the understanding of sex differences in diseases, and to provide more information about these differences to improve not only the treatment of patients with lung adenocarcinoma (LUAD) but with other diseases as well.

This analysis aimed to identify sex-specific differences in lung adenocarcinoma. This was done by first reconstructing regulatory LUAD and normal lung networks by using the PANDA method (Passing Attributes between Networks for Data Assimilation). Next, differential targeting between normal and LUAD lung was computed to find the difference between the male and female LUAD networks, and the male and female normal lung networks. Finally, a gene set enrichment analysis for LUAD and normal lung was completed to identify enriched and depleted genes in these sets.

Results found that there are significant differences between males and females in both the LUAD and normal lung networks. There seems to be a significant difference in the immuno-respiratory system between males and females, supporting theories that women are more likely to develop asthma, lung cancer, and other lung related diseases. Overall this method was found to be accurate in finding sex differences in LUAD, and could be used on data from other diseases to discover more about sex differences, and improve healthcare.