Differences between unstimulated and stimulated human male and female neutrophils in protein and phosphoprotein profiles

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Abstract

Human males and females show differences in the incidence of neutrophil-associated diseases and differences in neutrophil responses such as a faster response to the chemorepellent SLIGKV in males. Little is known about the basis of sex-based differences in human neutrophils. We used mass spectrometry to identify proteins and phosphoproteins in unstimulated human neutrophils and in neutrophils incubated with the SLIGKV, a protease activated receptor 2 agonist. There were 132 proteins with higher levels in unstimulated male neutrophils; these proteins tended to be associated with RNA regulation, ribosome, and phosphoinositide signaling pathways, whereas 30 proteins with higher levels in unstimulated female neutrophils were associated with metabolic processes, proteosomes, and phosphatase regulatory proteins. Unstimulated male neutrophils had increased phosphorylation of 32 proteins compared to females. After exposure to SLIGKV, male neutrophils showed a faster response in terms of protein phosphorylation compared to female neutrophils. Male neutrophils have higher levels of proteins and higher phosphorylation of proteins associated with RNA processing and signaling pathways. Female neutrophils have higher levels of proteins associated with metabolism and proteolytic pathways. This suggests that male neutrophils might be more ready to adapt to a new environment, and female neutrophils might be more effective at responding to pathogens.

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