Guarea kunthiana Bark Extract Enhances the Antimicrobial Activities of Human and Bovine Neutrophils

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Abstract - *Guarea kunthiana* is used in folk remedies for the treatment of several diseases including microbial infections. The mechanism behind this phenomenon still needs to be elucidated. Here, we investigated the effect of *G. kunthiana* bark extract on antimicrobial functions of human and bovine neutrophils as the first line of defense against infections. For this aim, neutrophils were isolated from either human or bovine blood and treated with *G. kunthiana* bark extract. The antimicrobial activity of the neutrophils against *Staphylococcus* (*S.*) *aureus* and *Escherichia* (*E.*) *coli* was tested in a bacterial survival assay and a fluorescence-based phagocytosis assay. Furthermore, the formation of neutrophil extracellular traps (NETs) was visualized by immunofluorescence microscopy. We show that neutrophils treated with *G. kunthiana* extract distinctly increased phagocytosis of *S. aureus* or *E. coli*. Interestingly, we demonstrate that *G. kunthiana* bark extract induces the formation of NETs in both cell types. This effect was abolished when treating the cells with diphenyleniodonium chloride (DPI) pointing to a direct implication of the NADPH oxidase-dependent formation of reactive oxygen species in this process. In summary, our data strongly suggest that *G. kunthiana* bark extract boosts the antimicrobial activities of neutrophils as the first line of defense against invading pathogens.