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Neutrophils not as ready to go as we thought?

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Background

Neutrophil granulocytes are innate immune cells that constantly patrol the bloodstream for danger signals and are ready to invade inflamed tissue to immediately limit pathogen spread. This rapid reactivity is also emphasized by the cells low transcription rate and densely packed granules. However, there is increasing evidence that neutrophils are heterogeneous. Our group recently observed neutrophils to change over the course of several hours after invading tissue infected with *Staphylococcus aureus*.

Objectives

To dissect neutrophil heterogeneity and its impact during infection.

Methods

Acquiring a murine biosensor that changes fluorescence upon UV illumination allowed us to distinguish cells based on the timing of their immigration. In addition, our group recently created and characterized a biosensor for *Staphylococcus aureus* proliferation *in vivo*.

Results

Phenotypically, neutrophils differ, depending on infiltration time, in the expression of markers related to activation and aging of the cell. Moreover, neutrophils that remain at the site of infection for more than three hours show not only higher phagocytic activity but also lower proliferation of ingested bacteria, compared to recently recruited cells. Therefore, neutrophils that have already spent several hours at the site of infection are better able to control infection than newly recruited cells.

Conclusion

After their arrival in the infected tissue, neutrophils appear to adapt to the infection and improve their control over the course of several hours. This raises further questions, such as why a short-lived and supposedly fully differentiated cell type needs several hours to become effective in fighting infection.