### INTRODUCTION

According to the United Nations (2013), the older population (over 60 years old) will double by 2050, reaching 2 billion people. The incidence of age-related diseases is also increasing.

Among those, Pneumonia is a major cause of infection related deaths in older adults, accounting for 1.6 million deaths per year (WHO 2003).

The main pathogen to cause pneumonia is the bacterium Streptococcus pneumoniae, and older adults are particularly susceptible to this disease, that affects both the extremes of age.

One of the reasons for this is because the immune system changes with age. It undergoes a process called immunosenescence, in which the cells undergo loss of function.

Among these cells, the neutrophils, which are central for achieving immunity against S. pneumoniae, show decreased function in old adults.

Therefore, our aim is to understand how and why neutrophil response to S. pneumoniae differs between healthy young and older adults.

### METHODS

After collecting peripheral blood from healthy young adults (HY) (<30 years) and from older adults (HE) (>65 years), neutrophil functions were assessed.

- Phagocytosis and Respiratory Burst in whole blood
  S. pneumoniae was opsonized with antibody or complement, as these molecules can enhance neutrophil functions. Serum from HY or HE were used as a source of complement.

- Neutrophil extracellular trap (NET) formation
  Neutrophils from HY and HE were incubated for 1 hour with live S. pneumoniae with a multiplicity of infection (MOI) of 1 and 10, and after, extracellular DNA released was stained for measurement.

### RESULTS

We found that neutrophils from older adults were internalizing (phagocytosing) the same quantity of S. pneumoniae as neutrophils from young adults.

However, neutrophils from the old produced less killing molecules, called reactive oxygen species, than neutrophils from young adults, after incubation with S. pneumoniae.

Analysis of NET production, which kills bacteria outside the cell, showed that neutrophils from the old produced more NETs than the young when less bacteria were present (MOI 1).

### CONCLUSIONS

Our results indicate that neutrophils from older adults are capable of generating NETs and internalizing S. pneumoniae, but their killing function is impaired. This could help to understand better the origin of susceptibility of elders to pneumonia.

### WHAT IS NEXT

Compare how neutrophil response to S. pneumoniae differ between healthy older adults and older adults with pneumonia.

### DO YOU WANT TO BE A VOLUNTEER?

You can be a volunteer to our study by donating blood. If you are interested, please contact me:

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**FINANCIAL SUPPORT:**

CAPES - Ministry of Education of Brazil