

Interaction between PMNs and biofilm

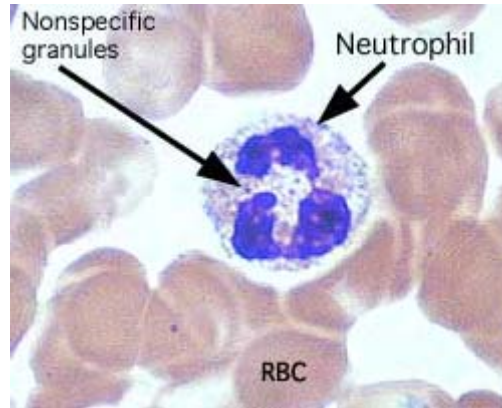


Fate of oxygen during the interaction between PMNs and *P. aeruginosa* biofilms in cystic fibrosis

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Polymorphonuclear leukocytes (PMNs):

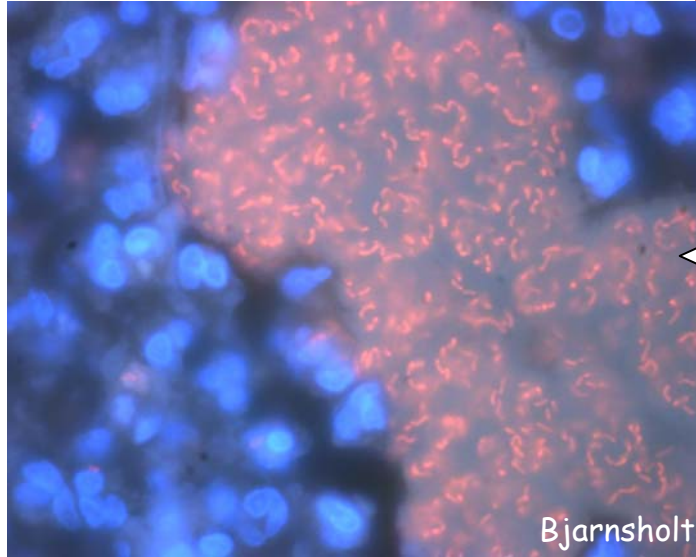


- Mobile, cellular component of the innate immune system
- Bactericidal
- Mediate inflammation
- Indispensable

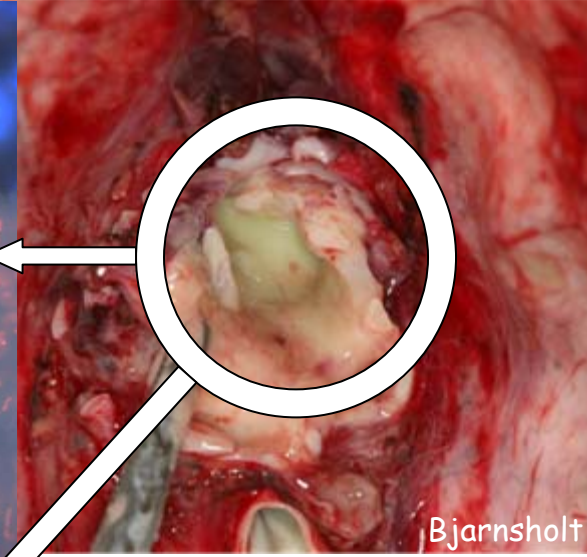
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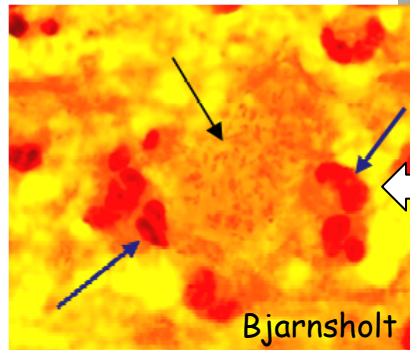
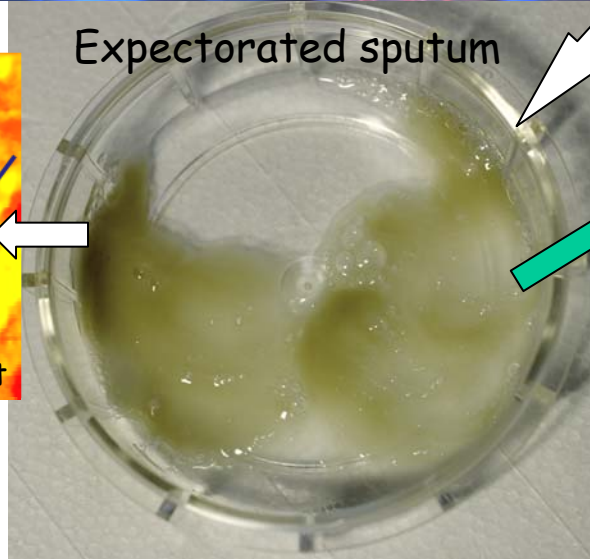
Battlezone in endobronchial mucus



Endobronchial mucus

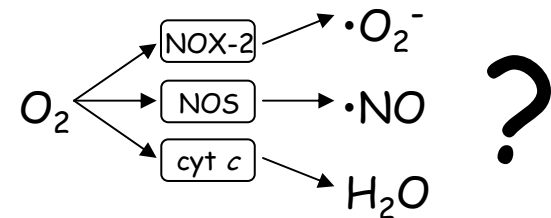


Expectorated sputum



Test of the hypothesis:

Activated PMNs consume O_2 for generation of ROS and RNS in CF airways.



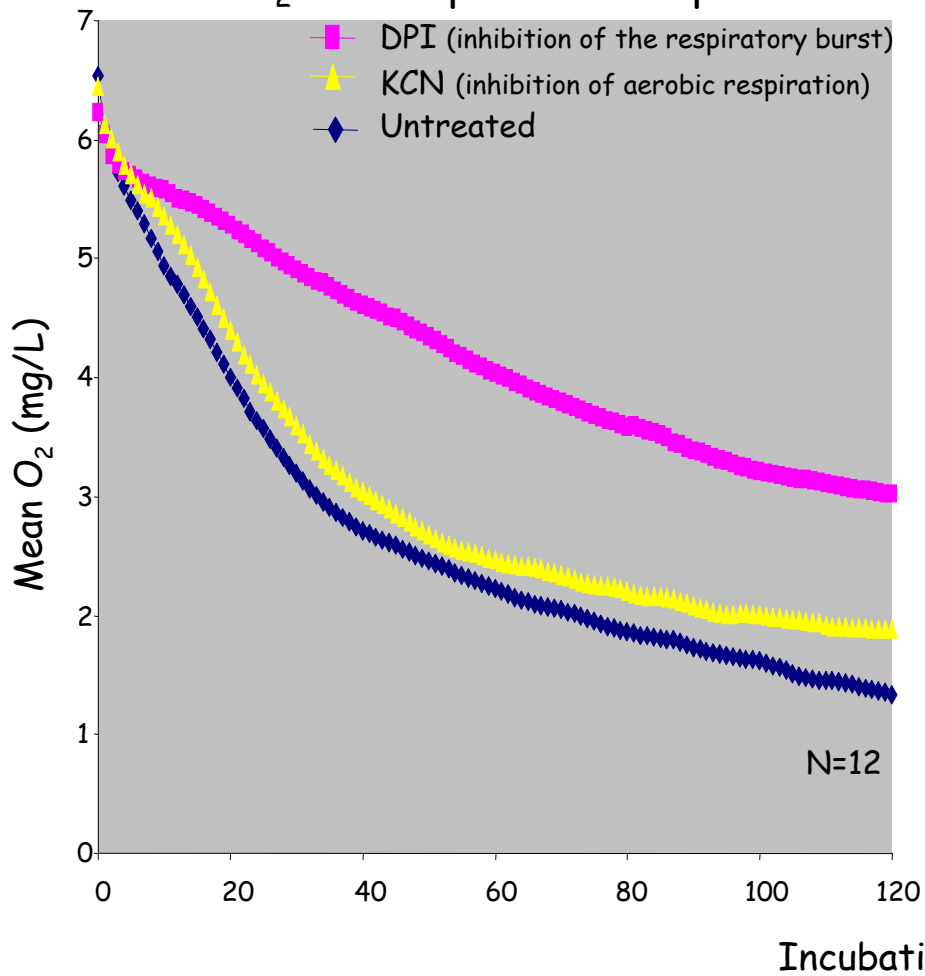
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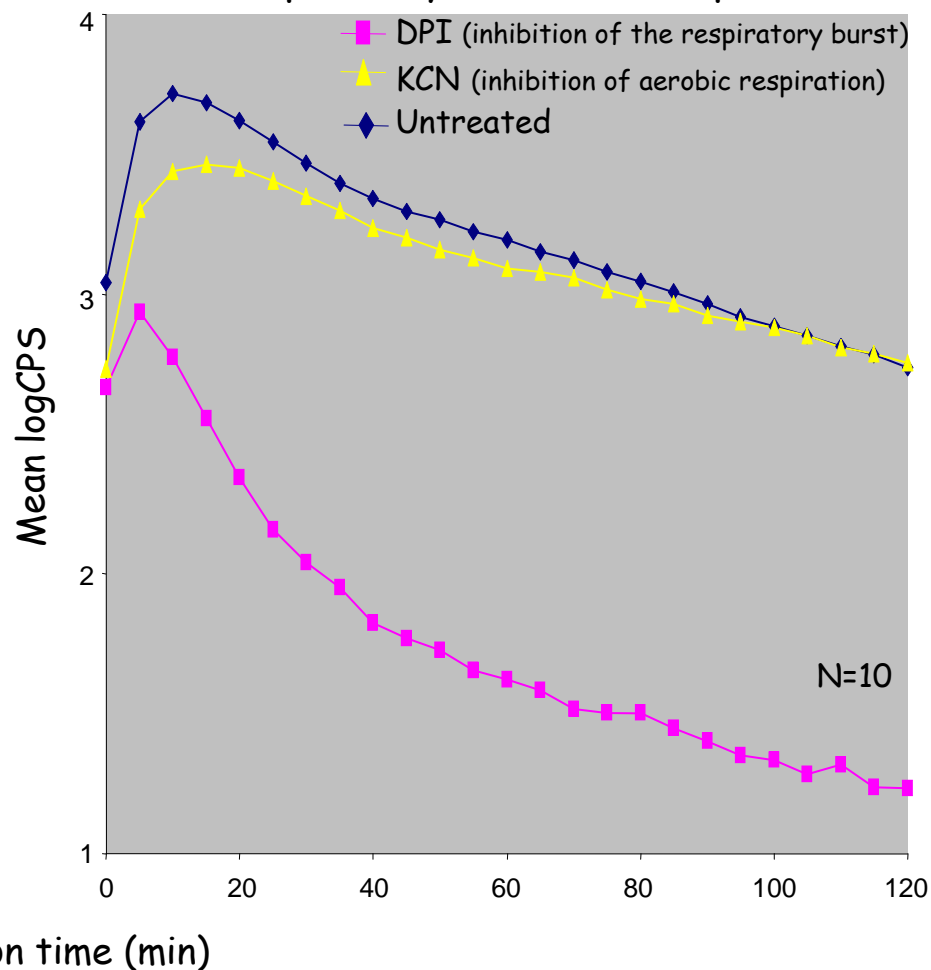
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CF sputum is alive and O_2 is mainly consumed by the respiratory burst

O_2 consumption in CF sputum



Respiratory burst in CF sputum

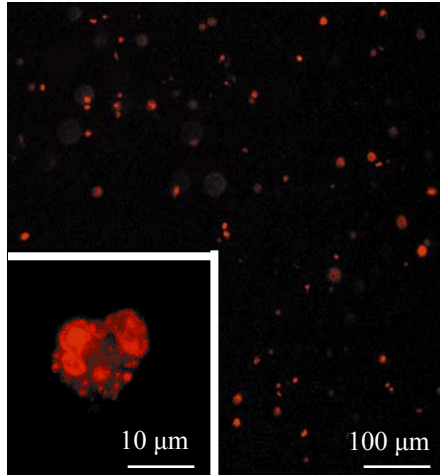


Interaction between PMNs and biofilm

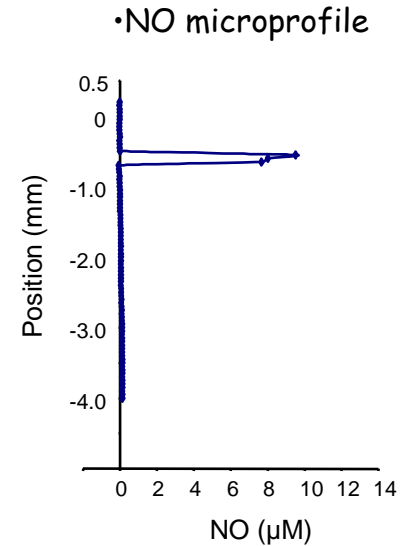
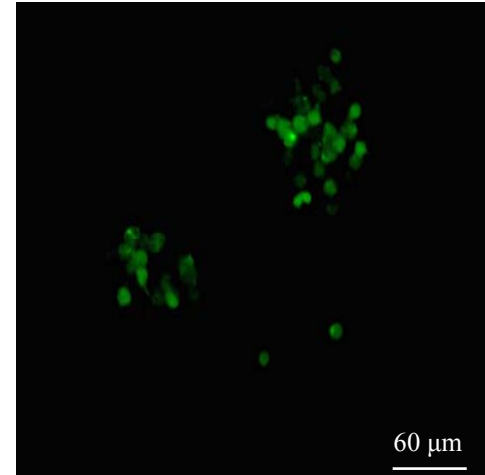


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Ongoing $\cdot O_2^-$ production in CF sputum
Indicator for $\cdot O_2^-$



Ongoing $\cdot NO$ production in CF sputum
Indicator for $\cdot NO$



PMNs consume the majority of the O_2 for production of $\cdot O_2^-$ and $\cdot NO$ in CF sputum

$\cdot O_2^-$ and $\cdot NO$ are substrates for i. e.: H_2O_2 , $HOCl$, O_3 , $\cdot OH$, $ONOO^-$, NO_3^-

Conclusion:

CF sputum contains activated PMNs that consume O_2 for formation of ROS and RNS and have the potential to induce anoxia and oxidative and nitrosative stress in CF airways

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Ongoing collection of evidence by:

O₂- and •NO microsensors

Fluorescence microscopy

Flow cytometry

Chemiluminescence

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