Reinforcement of the bactericidal effect of ciprofloxacin on Pseudomonas aeruginosa biofilm by hyperbaric oxygen treatment - DTU Orbit (08/11/2017)

Reinforcement of the bactericidal effect of ciprofloxacin on Pseudomonas aeruginosa biofilm by hyperbaric oxygen treatment

Chronic Pseudomonas aeruginosa lung infection is the most severe complication in cystic fibrosis patients. It is characterised by antibiotic-tolerant biofilms in the endobronchial mucus with zones of oxygen (O2) depletion mainly due to polymorphonuclear leucocyte activity. Whilst the exact mechanisms affecting antibiotic effectiveness on biofilms remain unclear, accumulating evidence suggests that the efficacy of several bactericidal antibiotics such as ciprofloxacin is enhanced by stimulation of the aerobic respiration of pathogens, and that lack of O2 increases their tolerance. Reoxygenation of O2-depleted biofilms may thus improve susceptibility to ciprofloxacin possibly by restoring aerobic respiration. We tested such a strategy using reoxygenation of O2-depleted P. aeruginosa strain PAO1 agarose-embedded biofilms by hyperbaric oxygen treatment (HBOT) (100% O2, 2.8bar), enhancing the diffusive supply for aerobic respiration during ciprofloxacin treatment. This proof-of-principle study demonstrates that biofilm reoxygenation by HBOT can significantly enhance the bactericidal activity of ciprofloxacin on P. aeruginosa. Combining ciprofloxacin treatment with HBOT thus clearly has potential to improve the treatment of P. aeruginosa biofilm infections.

General information

State: Published
Organisations: Department of Electrical Engineering, Biomedical Engineering, University of Copenhagen
Authors: Kolpen, M. (Ekstern), Mousavi, N. (Ekstern), Sams, T. (Intern), Bjarnsholt, T. (Ekstern), Ciofu, O. (Ekstern), Moser, C. (Ekstern), Kühl, M. (Ekstern), Høiby, N. (Ekstern), Jensen, P. Ø. (Ekstern)
Pages: 163-167
Publication date: 2016
Main Research Area: Technical/natural sciences

Publication information

Journal: International Journal of Antimicrobial Agents
Volume: 47
Issue number: 2
ISSN (Print): 0924-8579
Ratings:
BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): SJR 1.565 SNIP 1.285 CiteScore 3.38
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.683 SNIP 1.54 CiteScore 3.45
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.475 SNIP 1.641 CiteScore 3.45
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.693 SNIP 1.58 CiteScore 3.63
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.624 SNIP 1.495 CiteScore 3.57
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.38 SNIP 1.315 CiteScore 3.15
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.323 SNIP 1.207
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 1.019 SNIP 1.013
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 1

Scopus rating (2008): SJR 1.186 SNIP 1.064
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 0.862 SNIP 0.994
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 0.924 SNIP 1.01
Scopus rating (2005): SJR 0.939 SNIP 1.13
Scopus rating (2004): SJR 0.693 SNIP 1.063
Scopus rating (2003): SJR 0.742 SNIP 1.02
Scopus rating (2002): SJR 0.64 SNIP 0.743
Scopus rating (2001): SJR 0.565 SNIP 0.739
Scopus rating (2000): SJR 0.441 SNIP 0.738
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 0.342 SNIP 0.561
Original language: English
Biofilm, Ciprofloxacin, Cystic fibrosis, Hyperbaric oxygen treatment, Pseudomonas aeruginosa, Microbiology (medical), Infectious Diseases, Pharmacology (medical)
DOIs:
10.1016/j.ijantimicag.2015.12.005
Source: FindIt
Source-ID: 2290052264
Publication: Research - peer-review › Journal article – Annual report year: 2016