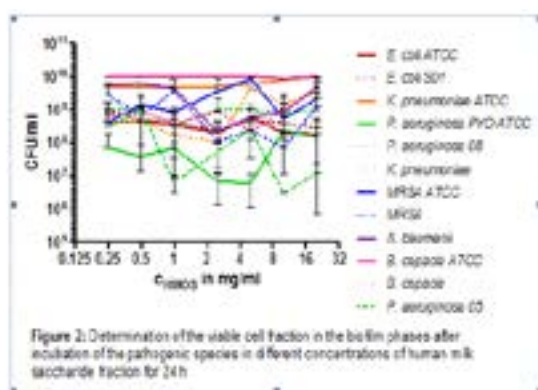


**Antibiofilm activity of Human Milk Oligosaccharides against matured biofilms formed by different pathogen species**Sylwia Jarzynka<sup>1</sup>, Kamila Ström<sup>1</sup>, Oliwia Makarewicz<sup>2</sup> and Gabriela Oledzka<sup>1</sup><sup>1</sup>Medical University of Warsaw, Poland<sup>2</sup>Jena University Hospital, Germany

**Statement of the Problem:** Due to its unique composition, human milk is an excellent source of nutrients and also many bioactive ingredients, which have as a potential healthy effect. Oligosaccharides (HMOs, Human Milk Oligosaccharides) is the main group with potential biocidal using, especially of medical procedures. Due to the concentration of the components of human milk, oligosaccharides, in addition to lactose and fats, are the third component. Due to their bioactivity, we hypothesised that HMOs exhibit an antimicrobial activity against a wide spectrum of human pathogenic bacteria. A systematic investigation of the antimicrobial spectrum of pooled or individual HMOs has not been performed for bacterial biofilm structure.

**Methodology & Theoretical Orientation:** Clinical isolates and reference strains of *Escherichia coli*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, *MRSA*, *Burkholderia cepacia* and *Acinetobacter baumannii* were used in this study. Human milk was obtained from nine healthy donors from Human Milk Bank in Warsaw Poland. Milk samples were pooled, next in the skimming milk proteins were precipitated. Carbohydrates with oligosaccharides fraction were then lyophilized. In the quantitative analysis of the biofilm we done determination of the minimal biofilm inhibitory concentration (MBIC), determination of colony forming units in the planktonic phase and of the minimal biofilm eradicated concentration (MBEC). Live/dead staining of the biofilms and CLSM image acquisition were used.

**Conclusion & Significance:** In our preliminary work, we could show that the human milk saccharide fraction exhibit moderately activity against some planktonic bacteria species (e.g. clinical isolates of *P. aeruginosa* and *MRSA*) and inhibit biofilm formation of *P. aeruginosa*. HMOs showed a biofilm eradicating effect on most tested pathogens. Oligosaccharides may potentially constitute a new medicinal product of natural origin, used in the prophylaxis and treatment of respiratory tract infections in patients with cystic fibrosis and COPD.

**Recent Publications:**

1. Ackerman, D. L., et al. (2017). Human Milk Oligosaccharides Exhibit Antimicrobial and Antibiofilm Properties against Group B Streptococcus. *ACS Infect Dis* 3(8): 595-605.
2. Bode, L. (2015). The functional biology of human milk oligosaccharides. *Early Hum Dev* 91(11): 619-622.

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3. Cosgrove, S. E., et al. (2002). Health and economic outcomes of the emergence of third-generation cephalosporin resistance in *Enterobacter* species. *Arch Intern Med* 162(2): 185-190.
4. Lewis, K. (2001). Riddle of biofilm resistance. *Antimicrob Agents Chemother* 45(4): 999-1007.
5. LiPuma, J. J. (2005). Update on the *Burkholderia cepacia* complex. *Curr Opin Pulm Med* 11(6): 528-533.

## **Biography**

Sylwia Jarzynka, together with a team of scientists from the Medical Biology Department in cooperation with the Jena University Hospital, Center for Infectious Diseases and Infection Control are involved in the study of antimicrobial biotic and abiotic factors. Special achievements of the researchers concern the inhibition of bacterial biofilm with the use of equal biomaterials, which are potential carriers of antimicrobial agents.

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