**Improving survival in premature infants: development of anti-biofilm feeding tubes**

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1. **The problem:** medical device-related infections in neonatal intensive care

   - **1 in 10 babies in the world is born premature**, requiring intensive use of medical devices to remain alive.
   - Devices are colonised by microbes that form **biofilms** on their surfaces, leading to severe infections.
   - Up to **56% of neonatal deaths** are related to hospital-acquired infections. Surviving babies are affected by life-long disabilities.

   - Most premature babies require feeding tubes to receive the nutrition necessary for development and health.

   - Up to **89% of neonatal feeding tubes** become colonised by bacteria.

   - Biofilms attached to feeding tubes may cause feeding intolerance, gastrointestinal or systemic infection.

   **“We aim to reduce the infection risk associated with feeding tubes among high-risk preterm infants by developing a polymer coating resistant to biofilm formation.”**

2. **Why anti-biofilm polymers?**

   - **Prevention is better than cure!** These **biocompatible materials** have been recently discovered to prevent biofilm formation instead of killing bacteria, helping to refrain from the advance of **bacterial resistance**.

   - **EgDPEA**
   - **CyDMA**
   - **IBNA**

   - Monomers composing anti-biofilm polymers

3. **Coating development**

   - **DegMA**
   - **EgDPEA**

   - Monomers combined with **DegMA** for improved mechanical properties

   - Tubes cut into 1 cm length segments

   - Coated tubes cross-sectional view (~20 µm thick coating)

   - Dip coating in polymer solution

4. **Investigation of biofilm formation on the surface of feeding tubes**

   - **Tube segments attached to a culture plate**
   - **Inoculation with green fluorescent-labelled bacteria**
   - **Imaging with confocal microscopy**

   - Images showing biofilms (green) attached to the surface of feeding tubes

   - **Biofilm formation is reduced up to 95% on coated feeding tubes**

   - **Future work**

   - Considering real-world conditions is important! The performance of the coated feeding tubes is currently being evaluated in the presence of milk.

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