Evaluation of Mammalian Stress and Inflammatory Response to a Novel Porphyrin

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**Rationale**

- Bacteria can be found virtually everywhere and cause numerous life threatening diseases.
- The rise of antibiotic-resistant strains of bacteria has made the investigation of new therapeutics necessary.
- Resistant strains of *Pseudomonas aeruginosa* frequently infect the lungs and can be difficult to treat.
- Porphyrins have potential to serve as a novel antibacterial agent, however, their safety in a mammalian environment needs to be evaluated.

**Methodology**

- Co-culture lung model: Alveolar A549 epithelial cells and U937 macrophages grown at a 3:1 ratio
- Porphyrin: “Zeke” synthesized at UD by Dr. Shawn Swavey
- Safety evaluation: Introduce Zeke into the co-culture at multiple dosages, incubate for 24 hours, then assess the biological response of the cellular system.

**Results**

- Zeke demonstrated strong antibacterial properties providing evidence that it is dark activated and can be highly effective against *P. aeruginosa*.
- The safety of Zeke is supported by unchanged cell viability, minimal increase in cellular stress and no negative effect on the immune response.

**Conclusions**

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**Figure 1**: Experimental Approach

**Figure 2**: Novel Metal Porphyrin Structure

**Figure 3**: Antibacterial efficacy of Zeke on *P. aeruginosa*

**Figure 4**: Co-culture cell viability following Zeke exposure

**Figure 5**: ROS levels at various Zeke concentrations

**Figure 6**: IL-8 cytokine secretion levels following Zeke exposure

**Figure 7**: U937 cells underwent staining for actin (blue) and Zeke (pink) following Zeke exposure

* Indicates statistical significance from untreated control, n=3, p<0.05