Canadian Association of Physicists
Association canadienne des physiciens et physiciennes

Contribution ID: **327** Type: **Oral Competition (Graduate Student) / Compétition orale (Étudiant(e) du 2e ou 3e cycle)**

(G*) Novel drug delivery system for antibiotic therapy using modified erythrocyte liposomes

Tuesday, 8 June 2021 12:05 (5 minutes)

As a result of the growing world-wide antibiotic resistance crisis, many currently existing antibiotics have been shown to be ineffective due to bacteria developing resistive mechanisms. There are a limited variety of potent antibiotics that are successful at suppressing microbial growth, such as polymyxin B, however, are deemed as a last resort due to their high toxicity. Adverse side effects associated with polymyxin B treatment include nephrotoxicity, neurotoxicity, and hypersensitivity. Previous research has focused on the development of an effective drug delivery system that can inhibit bacterial growth while minimizing negative side effects. In particular, nanoparticles have been of interest as they can be conjugated to a drug of interest, allowing for effective drug transport to the target. Despite their potential, an antibiotic delivery system has yet to be established, due to the nanoparticles lacking specificity and lack of biocompatibility and rejection. Here, we present a novel antimicrobial drug delivery method that uses modified red blood cells (RBC) that are encapsulated around polymyxin B. These RBC-based antibiotics are made specific to certain bacteria through the addition of the corresponding antibodies to their cell membranes. We investigate whether this drug delivery system is effective at inhibiting bacterial growth and selective, which is important to minimize the negative side effects seen with conventional polymyxin B treatment. This RBC based platform is potentially advantageous to synthetic nanoparticle-based approaches because of their biocompatibility and bioavailability, resulting in longer retention time in the human body.

Primary authors: KRIVIC, Hannah (McMaster University); SUN, Ruthie (McMaster University); HIMBERT, Sebastian (McMaster University); RHEINSTADTER, Maikel (McMaster University)

Presenter: KRIVIC, Hannah (McMaster University)

Session Classification: TS-6-1 COVID & Biomicrofluidics (DPMB Symposium) / COVID et biomicrofluidique (Symposium DPMB)

Track Classification: Symposia Day (DPMB) - Impactful advances in biological and medical physics