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Comparison of JAWSII Cell Line and Bone Marrow-Derived Cells in Responsiveness to Tuberculosis Infection

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Mycobacterium tuberculosis (Mtb), the bacteria that causes tuberculosis (TB), infects one third of the world's population, 5-10% of whom develop active TB, in which the bacteria invades and damages the lungs. One reason for this large global disease burden is the emergence of multi-drug resistant (MDR) strains of TB, which accounts for the majority of deaths. In order to address MDR-TB, a new vaccine must be formulated to protect against the infection. The determination of ideal candidates for vaccine adjuvants to help dendritic cells drive strong cytokine-mediated responses to TB challenge is the aim of the current research. The goal of this study was to determine whether or not the JAWS II cell line could be used as a substitute for the more costly, time-consuming bone marrow-derived cells (BMDC) in adjuvant testing. This study compared the sensitivity and reactivity of JAWSII cells and BMDC to infection with various strains of TB by assessing cytokine levels as a metric of immune activity. The central hypothesis of this study was that if JAWSII can be shown to respond to infection in a similar way as BMDC do, and a well evidenced phenomenon in BMDC can be replicated in the JAWSII cell line, then JAWSII behaves in a way that is both similar to BMDC and is biologically relevant, meaning it can be used in lieu of BMDC for future experiments. The data suggest that the JAWSII should be grown in recommended media, that the JAWSII cell line is basally more active than BMDC, and that the JAWSII system is not as sensitive to infection as BMDC. Therefore, it is unlikely JAWSII is a suitable replacement for BMDC for future experiments. Future directions include running similar experiments with more trials, different cytokines, different concentrations of bacteria, and comparative RNA/cDNA analyses.