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Meagan Herald* (heraldmc@vmi.edu), Mallory Hall, VMI, Lexington, VA 24450. *Mathematical Model of Classically and Alternatively Activated Macrophage Cells.*

Inflammation is a dynamic process, directed by macrophage cells, that has the potential to both help and hinder infection resolution. Focusing on macrophage activation levels has advanced our understanding of infection resulting in inflammation especially in diseases such as cystic fibrosis where patients could already be colonized with a different species of bacteria such as *Pseudomonas aeruginosa*. To look at the impact alternatively activated macrophage cells have on infection resolution, a nonlinear system of differential equations was created to describe the interactions between the classically and alternatively activated macrophage populations in a chronically infected respiratory tissue during a secondary bacterial challenge. Without a secondary bacterial specie present, the macrophage population tends to one activation level or the other depending on the local cytokine milieu. As the alternative macrophage signal increases, either naturally or artificially, the threshold which divides the paradigm also shifts affecting the system's ability to resolve secondary infections. (Received January 12, 2015)