

## Massachusetts General Hospital II

### *Host Transcription Response to Differentiate Sterile Inflammation from Infection*

Antimicrobial resistance has emerged as an important problem worldwide and the intensive care unit is considered the epicenter of resistance development. Decreased host defenses and increased risk of nosocomial infections in ICU, coupled with excessive use of broad spectrum antimicrobial agents seen in ICU favor development of antimicrobial resistance. Accurate diagnosis of infection and rational use of antimicrobials are well recognized strategies to curb the growth in antimicrobial resistance. However, there is lack of good quality evidence which guide clinicians on when to start and when to stop antibiotics. In fact, neither clinical symptomatology nor any laboratory tests can reliably diagnose presence of infection in a patient with severe systemic inflammatory response. Thus, a tool which can reliably identify presence or absence of infection, will allow rational initiation and termination of antimicrobial therapy, and thus be an important step in curbing antimicrobial resistance. Recently, host genetic expression response to infection measured as RNA transcription response is emerging as a potential tool for identification of host genome activation patterns consistent with infection. However current studies are limited by absence of a true control group, lack of a true gold standard, and limited generalizability. We propose to identify unique genetic signatures in presence of infection can which can be used in development of point of care tools, such as RT-PCR, to differentiate between sterile inflammation and infection, allowing rational decision making for antimicrobial therapy.