

Wednesday, February 2, 2022  
11:00am - 12:00pm PT



## Dr. David Farrell

Professor of Surgery, Oregon Health & Science University  
Founder and Chief Scientific Officer of Gamma Diagnostics

### “ $\Gamma$ Fibrinogen and COVID-19; Who Knew?”

**Introduction:** COVID-19 disease progression can be accompanied by a "cytokine storm" that leads to secondary sequelae such as thrombosis and acute respiratory distress syndrome. Several inflammatory cytokines have been associated with COVID-19 disease progression, but have far too much daily intra-individual variability to be useful in tracking the course of the disease. In contrast, we have shown that the inflammatory biomarker  $\gamma'$  fibrinogen ( $\gamma'$  Fbg) has a 6-fold lower coefficient of variability compared to other inflammatory markers such as hs-CRP. The aims of the study were to measure  $\gamma'$  Fbg in serial blood samples from COVID-19 patients at a tertiary care medical center in order to investigate its association with clinical measures of disease progression.

**Hypothesis:** Our hypothesis was that  $\gamma'$  Fbg levels would be elevated in COVID-19 patients compared to historical controls, and that the degree of elevation would be associated with disease severity.

**Methods:** COVID-19 patients at a tertiary care medical center were retrospectively enrolled between 3/16/2020 and 8/1/2020.  $\gamma'$  Fbg was measured using the GammaCoeur ELISA (Gamma Diagnostics, Patent Pending).

**Results:** Our results showed that ten out of the eighteen patients with COVID-19 had the highest levels of  $\gamma'$  Fbg ever recorded. The previous highest  $\gamma'$  Fbg level of 80.3 mg/dL was found in a study of 10,601 participants in the ARIC study.  $\gamma'$  Fbg levels were significantly associated with the need for ECMO and mortality.

**Conclusions:** We found that COVID-19 patients can develop extraordinarily high levels of  $\gamma'$  Fbg. This has several important clinical implications.  $\gamma'$  Fbg contains a high affinity binding site for thrombin that binds to anion-binding exosite II on thrombin and protects it from inactivation by heparin. High levels of  $\gamma'$  Fbg therefore provide a reservoir of heparin-resistant clot-bound thrombin when the  $\gamma'$  Fbg is clotted. These findings have potential clinical implications regarding prophylactic anticoagulation of COVID-19 patients and suggest that heparin prophylaxis may be less effective than using other anticoagulants, particularly direct thrombin inhibitors.