

STANDARD DEVIATIONS: A Differential Difference

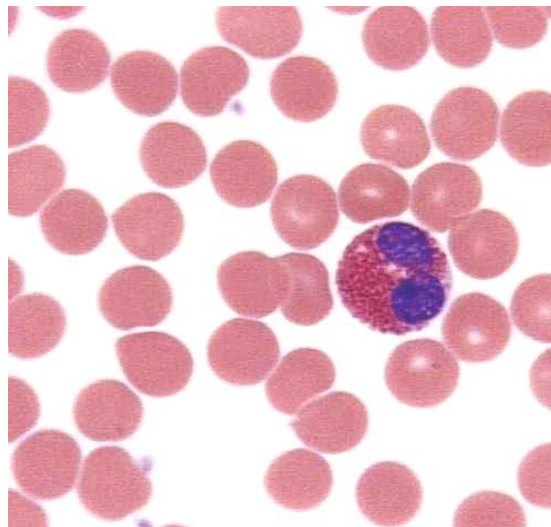
Greetings,

Laboratorians don't make a diagnosis, but we do make the diagnosis possible. Our results answer questions about a patient's condition that allow the practitioner to identify a malady and begin the healing process. Laboratory science pulls back the curtains and clears away the clutter revealing the diagnostic fingerprint of a disease.

We characterize and quantify all kinds of markers and clues that enable the physician to pronounce a diagnosis and the therapeutic response. From basic chemistries to selective growth media to exotic, esoteric send-outs, we tease out threads of evidence in our specialized fields. From our patchwork of specialties we quilt together the distinct tapestry of a particular condition.

For instance, elevated enzymes are indicators, Gram stains narrow our focus, cell counts give perspective; and we use each lab area like the parts of an orchestra to create a whole symphony of data unique to a disease. Recognizing these signature analytes is what we do as laboratory professionals.

An interesting lab signature is being observed with COVID-19, **eosinopenia**. Eosinophils are potent proinflammatory cells, primarily due to their characteristic red granules, which are packed with cytotoxic proteins, including eosinophil peroxidase, and 2 RNAses (eosinophil cationic protein and eosinophil neurotoxin). The granules sequester eosin from the stain and have a unique appearance in a blood smear differential. Our understanding of these cells has identified important roles in regulating immunity, organ development, and metabolism. They are found in tissues of the gastrointestinal tract and lung as well as circulating in our blood.



{Classic bi-lobulated EO}



Eosinophils normally account for only a small percentage of circulating leukocytes (1%-3%), but their levels can vary in differing disease states. Asthma is a pathology associated with eosinophil expansion. In addition to drug-induced eosinopenia, eosinophil depletion occurs in response to conditions that trigger acute inflammation, like sepsis.

And, now, reports of eosinopenia are being seen with COVID-19. Several studies have noted abnormally low absolute eosinophil counts in a majority of cases and a distinct correlation in improved counts with recovery, and depleted counts in fatal outcomes. Patients with low EOS counts at admission were more likely to have fever, fatigue, and shortness of breath, with more lesions in chest CT and radiographic aggravation, and longer length of hospital stay and course of disease than those with normal EOS counts.

This is raising some questions. Do patients with eosinopenia have unique COVID-19 disease? Do EOS contribute to pathology? Are EOS going to be important in therapeutic or vaccine strategies?

The importance of the eosinophil in COVID-19 disease is not yet understood. These cells are important to inflammatory response and hyper inflammation is a significant morbidity factor in COVID-19. The lungs are a critical organ target of viral progression and EOS are prominent in lung tissue morphology. Their role is helpful to diagnosis and the subject of therapy and vaccine studies. As astute laboratorians, we can use the differential in our toolbox to discern and indicate possible disease using eosinophils as a beacon for diagnosis, and perhaps evaluation and prognosis.

I think that's good to know.

Have a great week and be safe,

Bryan

