TRANSFUSION-RELATED IMMUNOMODULATION: WHAT’S IN THE BLOOD?

There’s something about red blood cell transfusions that may cause certain patients to experience immune dysregulation and poor outcomes. While physician-scientists narrow it down, here’s an introduction to the top contenders most likely to influence post-transfusion health.

- **WHITE BLOOD CELLS**
  Most get removed during blood processing, but white cells and their components (such as cytokines) may increase infection, inflammation and immunosuppression risks.

- **RED BLOOD CELLS**
  The influx of blood may tax the body’s monocytes and macrophages. This overload may trigger inflammation and immunosuppression by changing the balance of oxygen, iron and hemoglobin.

- **STORAGE AND PROCESSING**
  Stored red blood cells develop “storage lesions” over time, impacting everything from pH level to how the cells use oxygen and iron. Different processing techniques may also leave more immune regulators, such as white blood cells, in the blood.

- **PLATELETS**
  Microparticles derived from platelets can suppress or activate immune cells.

- **BIOACTIVE LIPIDS**
  Polyunsaturated fatty acids accumulate in blood units during storage and may play a role in inflammation and transfusion-related acute lung injury.

- **EXTRACELLULAR VESICLES**
  Tiny microvesicles, exosomes and other components increase during blood storage and may cause both inflammation and immunosuppression.

- **DONOR CHARACTERISTICS**
  Everyone’s blood is different, resulting in varied amounts of cells and their components from blood bag to blood bag. Some donations may have more of whatever causes immunosuppression than others.

- **RECIPIENT CHARACTERISTICS**
  Patients who have already experienced serious “hits” to the immune system, such as infection or trauma, may be less able to handle immune regulators in donor blood than healthy patients.

Reference: