



Revista de la Facultad de Medicina

ISSN: 2357-3848

ISSN: 0120-0011

Universidad Nacional de Colombia

Yasno-Navia, Paola Andrea; Zuñiga-Ceron, Luisa Fernanda;
Saavedra-Torres, Jhan Sebastian; Pinzón-Fernández, María Virginia
Endotoxins and the importance of procalcitonin
Revista de la Facultad de Medicina, vol. 67, no. 1, 2019, January-March, pp. 169-170
Universidad Nacional de Colombia

DOI: 10.15446/revfacmed.v67n1.69593

Available in: <http://www.redalyc.org/articulo.oa?id=576364220024>

- How to cite
- Complete issue
- More information about this article
- Journal's webpage in redalyc.org

UNEM  redalyc.org

Scientific Information System Redalyc

Network of Scientific Journals from Latin America and the Caribbean, Spain and Portugal

Project academic non-profit, developed under the open access initiative

LETTER TO THE EDITOR

DOI: <http://dx.doi.org/10.15446/revfacmed.v67n1.69593>

Endotoxins and the importance of procalcitonin

Endotoxinas y la importancia de la procalcitonina

Received: 27/12/2017. Accepted: 07/04/2018.

Paola Andrea Yasno-Navia^{1,2} • Luisa Fernanda Zuñiga-Ceron^{1,2} • Jhan Sebastian Saavedra-Torres^{1,2} • María Virginia Pinzón-Fernández^{1,2}¹ Universidad del Cauca - Faculty of Health Sciences - Department of Internal Medicine - Popayán - Colombia.² Universidad del Cauca - Faculty of Health Sciences - Health Research Group (GIS) - Popayán - Colombia.

Corresponding author: María Virginia Pinzón-Fernández. Department of Internal Medicine, Faculty of Health Sciences, Universidad del Cauca. Carrera 6 No. 13N-50, Laboratorio de Microbiología. Telephone number: 8209870, 8209800, ext.: 2717. Mobile number: +57 1 317-4427729. Popayán, Colombia. Email: mpinzon@unicauca.edu.co.

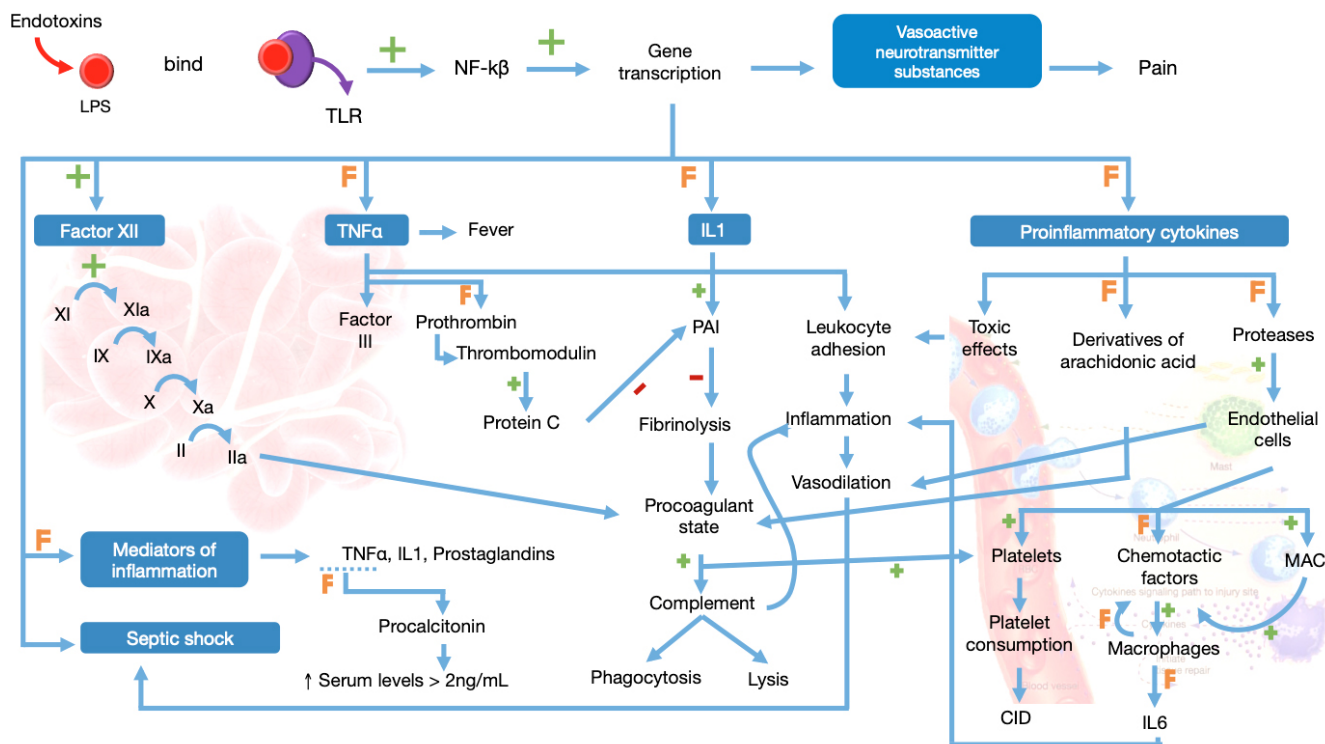
Dear editor:

Gram-negative bacilli and cocci bacteria produce and release endotoxins, which are lipopolysaccharides found in the outer membrane of the cell wall. These endotoxins are responsible for releasing a series of inflammatory mediators such as IL1, TNF α and proteases, as well as

lipid mediators such as prostaglandins, leukotrienes, thromboxanes and platelet-activating factor, ultimately activating immune response cells like leukocytes, macrophages and platelets. These cells amplify the response to shock, generate a procoagulant state and produce alterations at the cellular level, for example, damage to the endothelium, which in the end benefit and worsen the state of septic shock (Figure 1).

MANIFESTATIONS OF ENDOTOXINS

Gram-negative bacilli and cocci bacteria release endotoxins that activate a series of inflammatory mediators. They activate immune response cells and produce a procoagulant state, causing damage to the endothelium and increasing the basal levels of procalcitonin. Finally, it leads to an immune response that benefits a state of septic shock, which is a leading cause of morbidity and mortality.

**Figure 1.** Manifestations of endotoxins.

LPS: Lipopolysaccharides; TLR: Toll-like receptors; NF- κ B: Nuclear factor κ B; TNF α : tumor necrosis factor alpha; IL: Interleukin; PAI: Plasminogen activator inhibitor; MAC: Membrane attack complex; CID: Disseminated intravascular coagulation; F: Free; +:Active; -:Inhibit.

Source: Own elaboration.

It is necessary to emphasize that shock is a leading cause of morbidity and mortality, despite the use of antibiotics. (1) Therefore, having available a marker that serves as a predictor of bacteremia and septic shock that is easy to obtain and perform, and that has specificity and sensitivity higher than 80% is necessary. This is the case of serum procalcitonin, an acute phase reactant that is usually found in plasma in minimum amounts that increase as the infection sets in and usually decrease with its resolution, thus confirming bacteremia. (2) This marker has a sensitivity of 83%, specificity of 93% and a positive predictive value greater than C-reactive protein (CRP) (3), which is why it should be used to diagnose and monitor the treatment of sepsis.

The multiple uses of markers for diseases of infectious origin such as meningitis and urinary tract infections should be considered, as it allows discerning an etiology of bacterial origin from other types of etiologies. Similarly, procalcitonin is useful for diagnosis of bacterial sepsis in adults, children (4), newborns and even in immunodeficient patients; it also acts as a guide to establish the efficacy of antibiotics during the treatment. (5)

In this regard, endotoxins imply a systemic compromise that, in the worst case, can lead to death by septic shock. In this way, it is important to have paraclinical tools at hand to achieve a timely diagnosis and determine the etiology of the clinical picture, and one of those tools is procalcitonin as a biomarker, since it is more specific and sensitive than other markers. (5)

The use of procalcitonin is relevant, but it should not be considered as the only and definitive option for the diagnosis of sepsis; it should be interpreted in the clinical context of each patient. Moreover, it is a biomarker that serves to monitor the infection, so re-evaluations should be made during the course of the disease. (6)

It is expected that its use will generate more efficient therapeutic strategies, so that it contributes to reducing mortality rates due to sepsis.

Conflict of interest

None stated by the authors.

Financing

None stated by the authors.

Acknowledgments

To Universidad del Cauca.

References

1. **Cárdenas-Perea ME, Cruz-y López OR, Gándara-Ramírez JL, Pérez-Hernández MA.** Factores de virulencia bacteriana: la inteligencia de las bacterias. *Elementos* 94. 2014;35-43.
2. **Arora S, Singh P, Singh PM, Trikha A.** Procalcitonin Levels in Survivors and Nonsurvivors of Sepsis. *Shock*. 2015;43(3):212-21. <http://doi.org/f62thx>.
3. **Adib M, Bakhshiani Z, Navaei F, Saheb-Fosoul F, Fouladi S, Kazemzadeh H.** Procalcitonin: A reliable marker for the diagnosis of Neonatal sepsis. *Iran J Basic Med Sci*. 2012;15(2):777-82.
4. **González-Rangel D, Camacho-Moreno G, Quintero-Guevara O.** Procalcitonina como marcador de sepsis en niños. *Rev. Fac. Med.* 2016;64(2):215-21. <http://doi.org/c5s2>.
5. **Casado-Flores J, Blanco-Quirós A.** Procalcitonina: un nuevo marcador de infección bacteriana. *Anales de Pediatría*. 2001;54(1):69-73. <http://doi.org/f2fqs7>.
6. **Wacker C, Prkno A, Brunkhorst FM, Schlattmann P.** Procalcitonin as a diagnostic marker for sepsis: a systematic review and meta-analysis. *Lancet Infect Dis*. 2013;13(5):426-35. <http://doi.org/f2h4z2>.