

Current trends in endotoxin detection and analysis of endotoxin-protein interactions

Abstract

Endotoxin is a type of pyrogen that can be found in Gram-negative bacteria. Endotoxin can form a stable interaction with other biomolecules thus making its removal difficult especially during the production of biopharmaceutical drugs. The prevention of endotoxins from contaminating biopharmaceutical products is paramount as endotoxin contamination, even in small quantities, can result in fever, inflammation, sepsis, tissue damage and even lead to death. Highly sensitive and accurate detection of endotoxins are keys in the development of biopharmaceutical products derived from Gram-negative bacteria. It will facilitate the study of the intermolecular interaction of an endotoxin with other biomolecules, hence the selection of appropriate endotoxin removal strategies. Currently, most researchers rely on the conventional LAL-based endotoxin detection method. However, new methods have been and are being developed to overcome the problems associated with the LAL-based method. This review paper highlights the current research trends in endotoxin detection from conventional methods to newly developed biosensors. Additionally, it also provides an overview of the use of electron microscopy, dynamic light scattering (DLS), fluorescence resonance energy transfer (FRET) and docking programs in the endotoxin-protein analysis.