Myoglobin

Myoglobin (symbol Mb or MB) is an iron- and oxygen-binding protein found in the muscle tissue of vertebrates in general and in almost all mammals. It is distantly related to hemoglobin which is the iron- and oxygen-binding protein in the blood, specifically in the red blood cells. In humans, myoglobin is only found in the bloodstream after muscle injury. It is an abnormal finding and can be diagnostically relevant when found in the blood.

Myoglobin (Mgb) accepts oxygen from circulating hemoglobin. After muscle injury, plasma Mgb levels may exceed the capacity of the normal clearing mechanisms (which includes haptoglobin binding) and Mgb can precipitate in glomerular filtrate causing renal tubular obstruction, direct nephrotoxicity, intrarenal vasoconstriction, and acute kidney injury. Mgb appears quickly in the blood and is rapidly cleared within 24 hours. If Mgb spills into the urine (myoglobinuria) it can cause urine to test positive for "blood." Reference range: 0–85 ng/mL

Given that myoglobin (Mb) is the earliest rising biomarker after AMI, recent studies have shown that Mb may be considered as a suitable biomarker for the detection of cardiac damage. Recently, aptamer-based biosensors (aptasensors) have attracted special attention for being accessible and their capability for sensitive detection of Mb. Moreover, the nano-aptasensors have provided new advances toward the accurate detection of Mb. In a review, AsI et al. provided an outline of the various types of optical and electrochemical-based aptasensors that have been developed for the determination of Mb-related AMI. They also summarized recent developments in the applications of nano-aptasensors for recognition of Mb as an AMI biomarker. Future perspectives and challenges of aptamer-based Mb detection are discussed in brief as well¹⁾.

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Asl SK, Rahimzadegan M. The recent progress in the early diagnosis of acute myocardial infarction based on myoglobin biomarker: Nano-aptasensors approaches. J Pharm Biomed Anal. 2022 Jan 29;211:114624. doi: 10.1016/j.jpba.2022.114624. Epub ahead of print. PMID: 35123334.

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