

# Analytical aspects of marinobufagenin and its applications in the diagnosis of preeclampsia

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## Introduction

Marinobufagenin (MBG), a bufadienolide cardiac inotrope, enjoys a growing interest in the early diagnosis of volume expansion-mediated hypertensive states such as preeclampsia (PE). This endogenous mammalian vasoconstrictive compound, is a selective inhibitor of the  $\alpha_1$  subunit of  $\text{Na}^+, \text{K}^+$ -ATPase, leading to hypertension and natriuresis. Enhanced production of MBG has been described in preeclamptic patients prior the development of hypertension and proteinuria, leading to consider MBG as a biomarker for PE [1-3].

However, the role of MBG as a biomarker remains to be fully understood as well as his biosynthetic pathway.

The need has arisen for an accuracy and sensitive analytical method of MBG plasma levels in order to further investigate the implications of MBG in PE, and to help to establish a diagnosis for this syndrome.

## Objective

Our aim is to develop a sensitive and robust analytical MBG dosage method allowing quantifications as low as possible. A critical threshold value may be established in order to discriminate normal pregnant from preeclamptic women.

## Methods

Nowadays, the MBG standard compound is not commercially available. It forced us to develop an extraction method of MBG from the crystallized toad *Bufo Marinus* venom.

A pre-extraction step on rat and human plasma is performed in order to clean and to concentrate samples.

Several liquid chromatography (LC) strategies coupled with different detection methods are considered and performed.

## Results and discussion

Pure MBG has been successfully extracted from the crystallized toad venom. The identity of the compound has been confirmed by different spectral techniques.

The pre-extraction step from plasma samples spiked with MBG has been carried out through a solid phase extraction HLB cartridge with an extraction yield of 88%.

Preliminary reversed-phase LC method allows quantifications of MBG between  $6\mu\text{g/mL}$  –  $11\mu\text{g/mL}$ .

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3. Vu, H.V., et al., *Involvement of Marinobufagenin in a Rat Model of Human Preeclampsia*. American Journal of Nephrology, 2005. 25(5): p. 520-528.