# Evaluation of $^{99m}$Tc-Sestamibi as a potential tool to investigate Pgp activity in inflammation

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**Introduction:** In the XXI Century's Society the scientific investigation process has been growing steadily, and the field of the pharmaceutical research is one of the most enthusiastic and relevant. Here, it is very important to correlate observed functional alterations with possibly modified drug biodistribution patterns.

Cancer, inflammation and infection are processes that induce many molecular intermediates like cytokines, chemokines and other chemical complexes that can alter the pharmacokinetics of many drugs. One cause of such changes is thought to be the modulator action of these complexes in the P-Glycoprotein activity, because they can act like inducers/inhibitors of MDR-1 expression. This protein results from the expression of MDR-1 gene, and acts as an ATP energy-dependent efflux pump, with their substrates including many drugs, like antiretrovirals, anticancers, anti-infectives, immunosuppressants, steroids or opioids.

**Objectives:** Because of the lack of methods to provide helpful information in the investigation of *in vivo* molecular changes in Pgp activity during infection/inflammation processes, and its value in the explanation of the altered drug pharmacokinetic, this paper want to evaluate the potential utility of $^{99m}$Tc-Sestamibi scintigraphy during this kind of health sciences investigation. Although the aim is indeed to create a technique to the *in vivo* study of Pgp activity, this preliminary Project only reaches the *in vitro* study phase, assumed as the first step in an evaluation period for a new tool development.

**Materials and Methods:** For that reason, we are performing *in vitro* studies of influx and efflux of $^{99m}$Tc-Sestamibi (that is a substrate of Pgp) in hepatocytes cell line (HepG2). We are interested in clarify the cellular behavior of this radiopharmaceutical in Lipopolysaccharide(LPS) stimulated cells (well known *in vitro* model of inflammation) to possibly approve this methodology. To validate the results, the Pgp expression will be finally evaluated using Western Blot technique.

**Results:** Up to this moment, we still don't have the final results, but we have already enough data to let us believe that LPS stimulation induce a downregulation of MDR-1, and consequently Pgp, which could conduce to a prolonged retention of $^{99m}$Tc-Sestamibi in the inflamed cells.

**Conclusions:** If and when this methodology demonstrate the promising results we expect, one will be able to conclude that Nuclear Medicine is an important tool to help evidence based research also on this specific field.

*Foi decidido que não será apresentada a versão integral deste documento.*

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