Mitochondrial membrane potential as possible biomarker in neurodegenerative disease

***D.R. Pereira*, P.W. Hameeteman, H.W. Grievink, and M. Moerland**

Centre for Human Drug Research, Leiden, the Netherlands

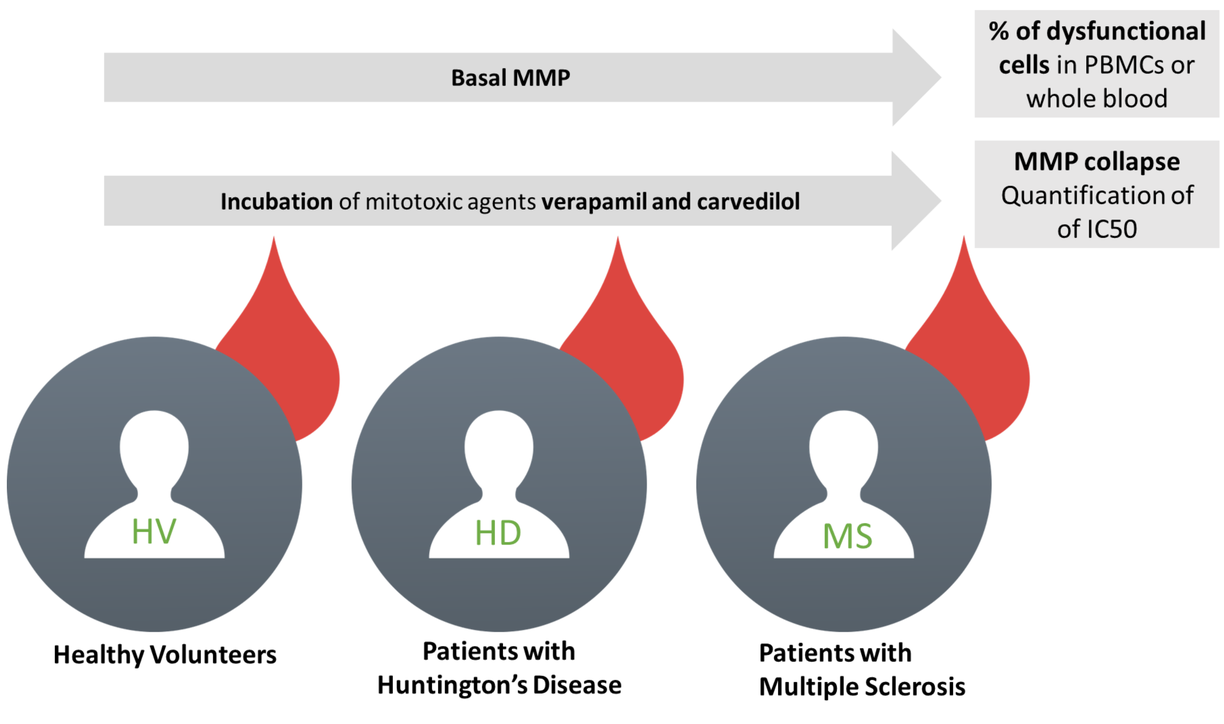
Introduction

- Dysfunctional mitochondria may be key in various pathophysiological conditions, including neurodegenerative diseases and systemic inflammatory conditions.
- The mitochondrial membrane potential (MMP) may serve as a biomarker reflecting the mitochondrial condition.
- Many techniques for the assessment of mitochondrial function are tissue-based and clinically impractical.
- Although this flow cytometry-based technique can be applied on human peripheral blood cells, this is rarely done.

Aim

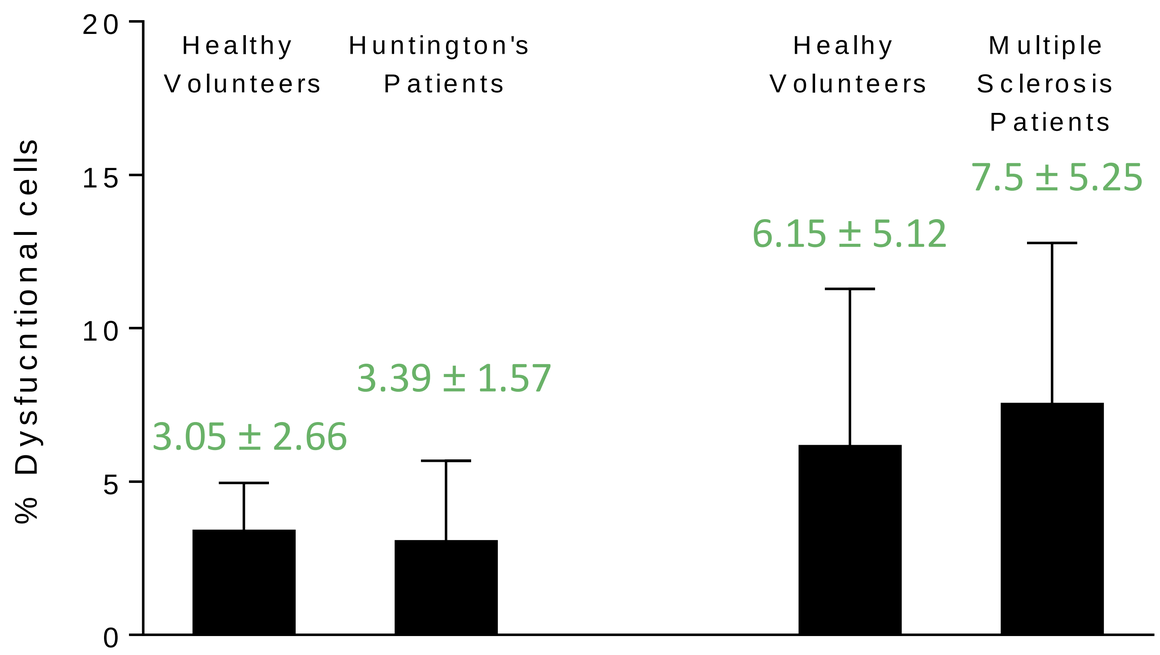
- To assess the basal levels of the mitochondria membrane potential (MMP) in blood-based cells of healthy volunteers, Huntington's (HD) and multiple sclerosis (MS) patients.
- To determine the MMP collapse upon incubation with mitotoxic compounds by quantification of the IC50.

Methods

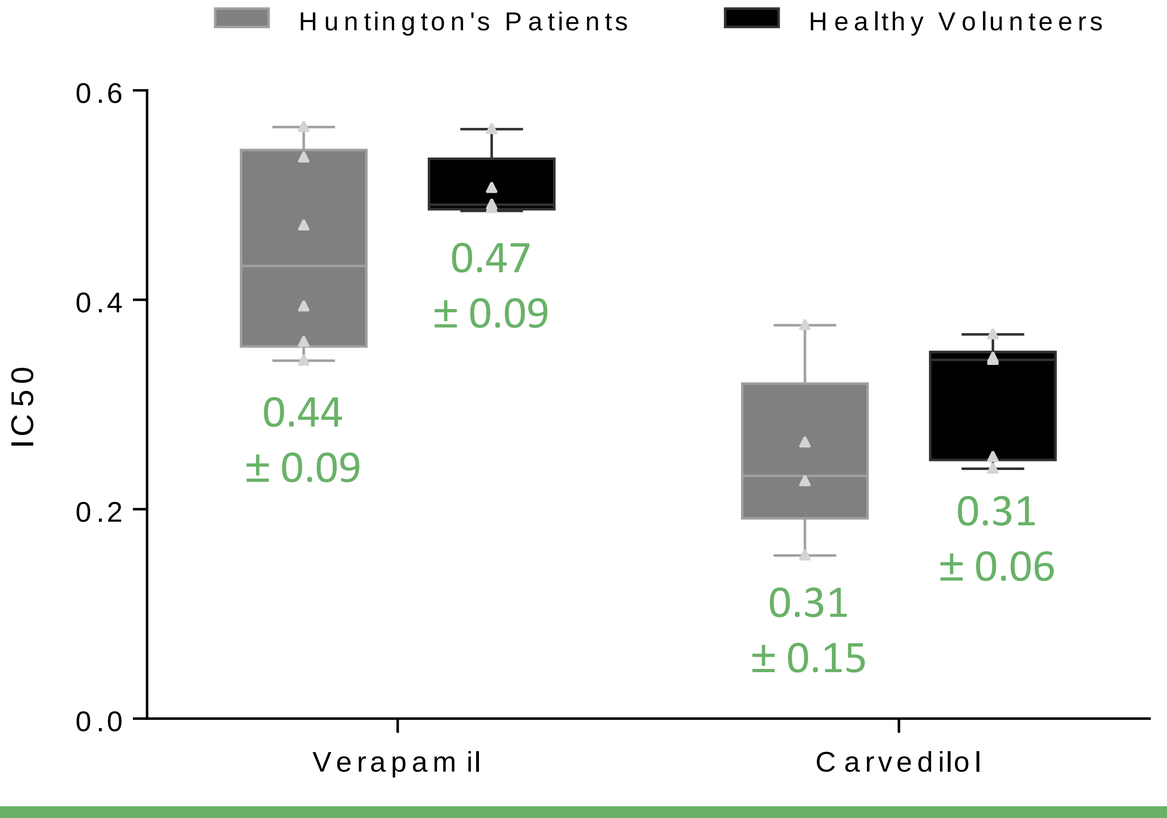


Results

No significant difference in basal MMP levels between HV, HD and MS in PBMCs or whole blood



No difference in IC50s of Carvedilol and Verapamil between healthy volunteers and patients with Huntington's disease



Conclusions

- The value of these blood cell-based assays as disease-related biomarker for neurodegenerative conditions is questionable.
- Future research will explore blood-based MMP in other neurodegenerative and inflammatory conditions, and will evaluate the modulation of MMP by pharmacological intervention.

CHDR
Centre for Human Drug Research

Centre for Human Drug Research | Zernikedreef 8 | 2333 CL Leiden | The Netherlands | Tel +31 71 52 46 400 | info@chdr.nl | www.chdr.nl

Poster presentation number: 1030