IN VIVO STUDY OF THE SV2A PROTEIN IN THE KAINIC ACID EPILEPSY RAT MODEL

ME. Serrano, G. Becker, MA. Bahri, C. Warnier, Joël Aerts, F. Mievis, F. Giacomelli, Ch. Lemaire, E. Salmon, A. Luxen, A. Plenevaux

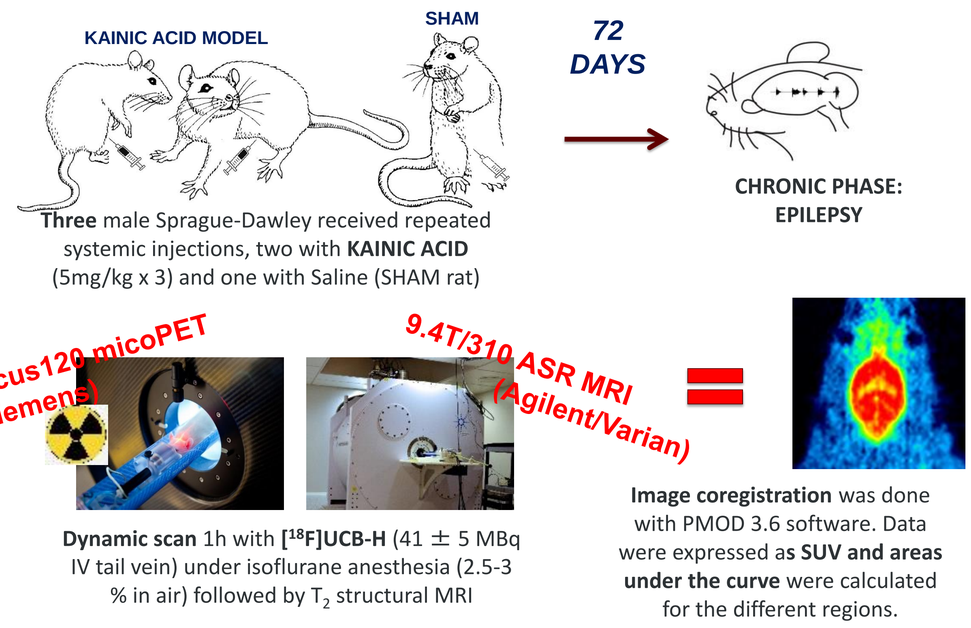
GIGA-Research, CRC In vivo Imaging, Université de Liège

Introduction

Epilepsy is one of the commonest neurological disorders [1]. Antiepileptic drugs mainly target the SV2A protein [2] but its actual role is still largely unknown. [18F]UCB-H was developed to study in vivo SV2A brain proteins [3, 4].

The present pilot study was undertaken to **evaluate for the first time in vivo in rats SV2A expression in the Kaïnic Acid (KA) epilepsy model** [5].

Methods



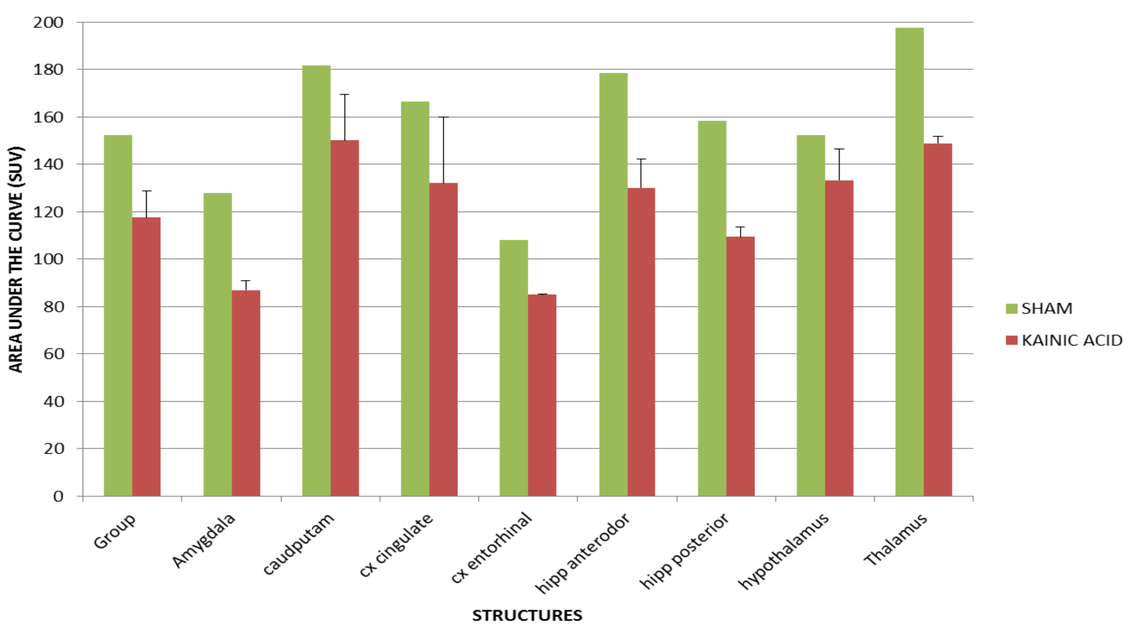
Three male Sprague-Dawley received repeated systemic injections, two with **KAINIC ACID** (5mg/kg x 3) and one with Saline (SHAM rat)

Dynamic scan 1h with **[^{18}F]UCB-H** (41 ± 5 MBq IV tail vein) under isoflurane anesthesia (2.5-3 % in air) followed by T_2 structural MRI

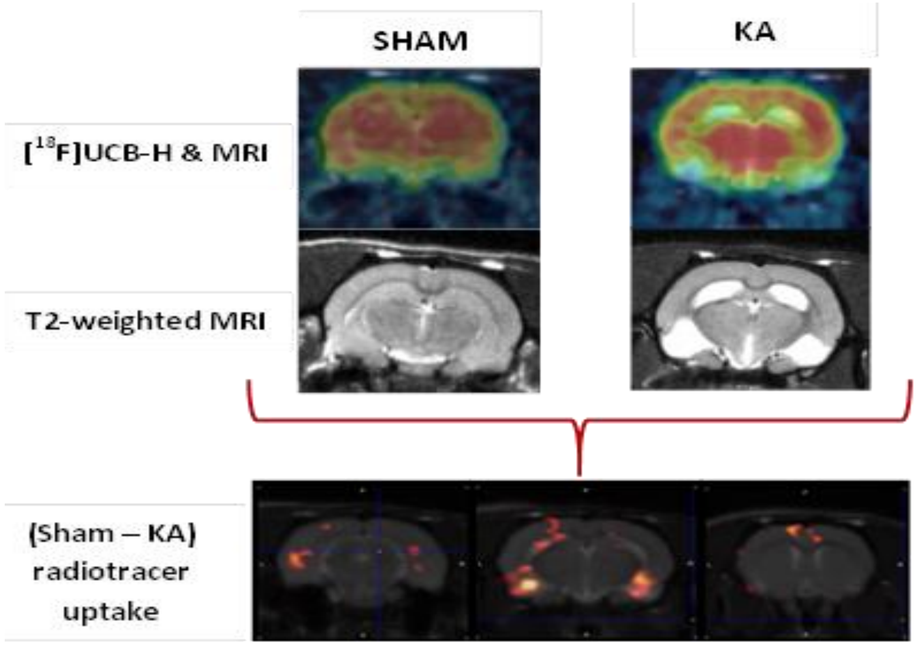
Image coregistration was done with PMOD 3.6 software. Data were expressed as **SUV and areas under the curve** were calculated for the different regions.

Results

[18F]UCB-H microPET images showed an important reduction (20-30%) for SV2A after KA injections mainly localized in amygdala, hippocampus, lateral parietal association cortex and cingulate cortex. The rest of the brain was globally unchanged. MRI revealed atrophy and inflammation in amygdala and hippocampus.



Areas under the curve (AUC), *calculated from the individual Standard Uptake Value (SUV) for the different brain regions implicated in epilepsy.*



Corregistration MRI and mPET *to show the differences in SV2A levels between the SHAM and 72 days after KA injections*

Conclusion

These preliminary results obtained in KA treated rats showed that:

- [18F]UCB-H was able to detect important modifications for SV2A in relevant regions for epilepsy
- Our radiotracer appears as a valuable tool to follow in vivo SV2A through longitudinal studies.
- KA model in rats deserves for further development and validation as a tool for the study of epilepsy.

[1] Alexopoulos, Epileptology, 2004; [2] Hamann et al., Eur J Pharmacol, 2008; [3] Bretin et al., Molecular Imaging and Biology, 2015; [4] Warnock et al., J Nucl Med., 2014; [5] Van Nieuwenhuyse et al., Brain Research, 2015; [6] Hellier et al., Epilepsy Res., 1998

This research was supported by FRS FNRS, Walloon Region and UCB Pharma. Alain Plenevaux is research director of the FRS-FNRS Belgium.

Contact : meserrano@ulg.ac.be