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

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**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]. Although this model is well studied in mice, few reports were devoted to rats. Imaging-wise, rats are very interesting thanks to a bigger brain size (reduction of the partial volume effect).

**Methods**

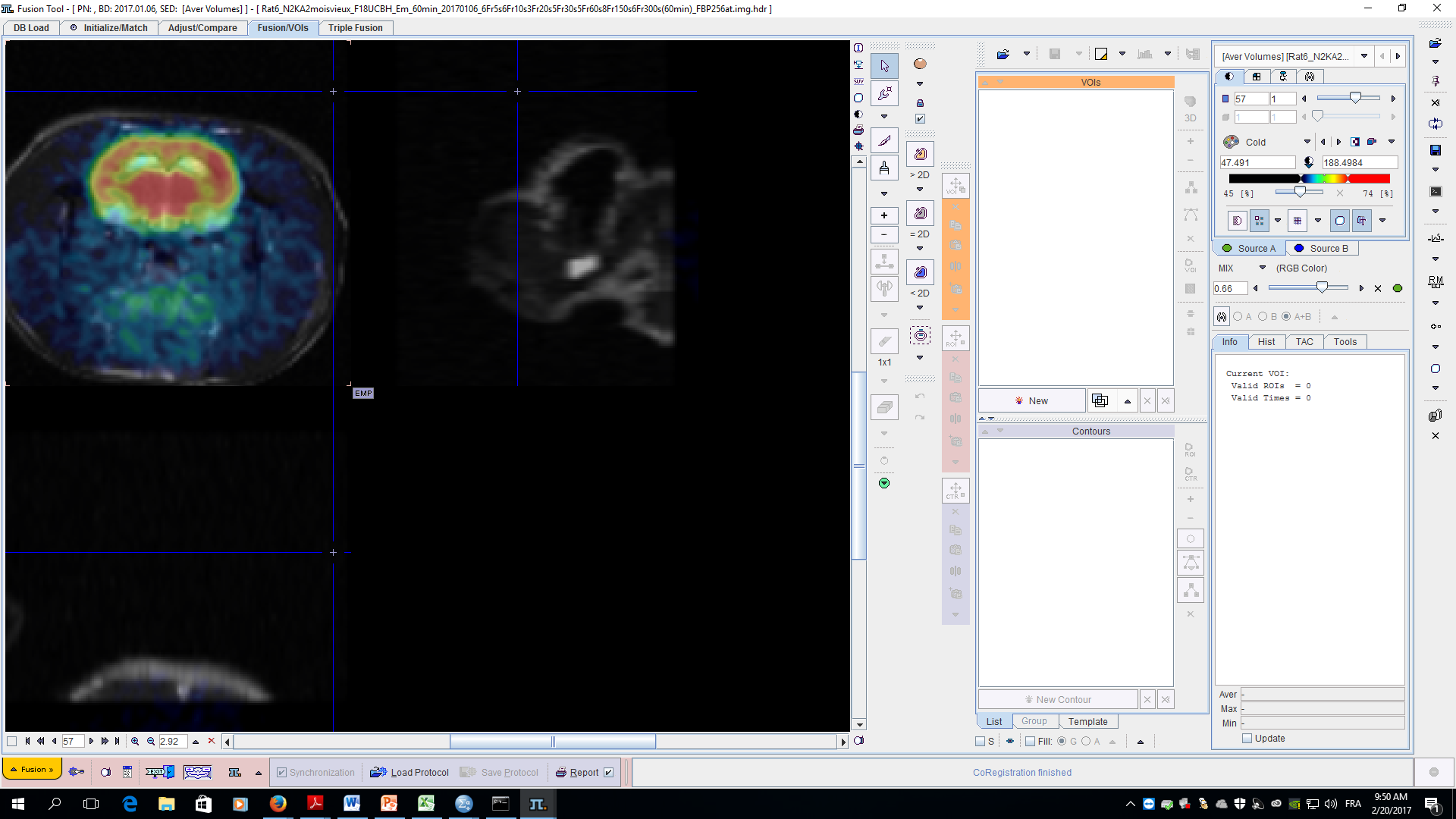
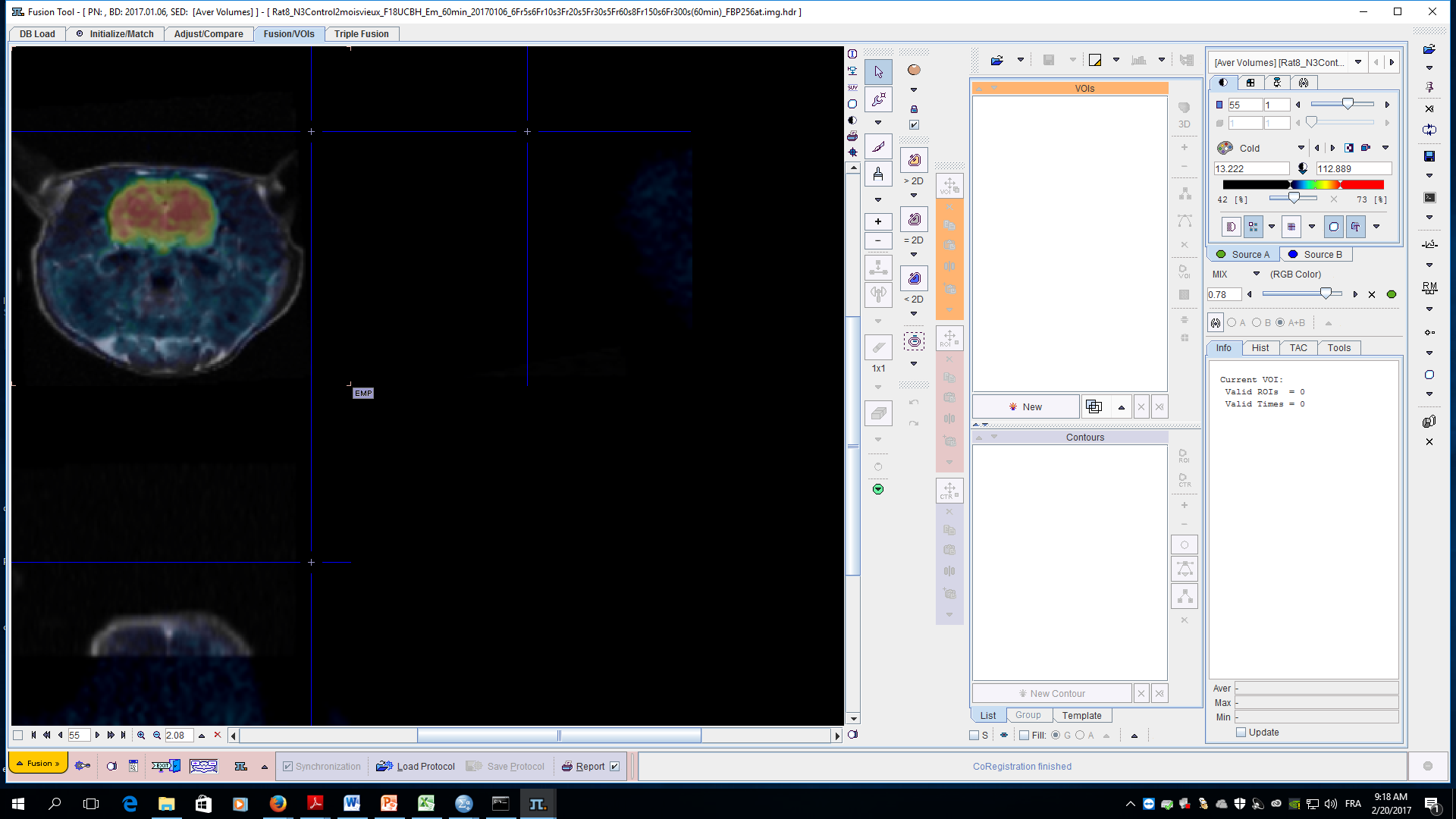
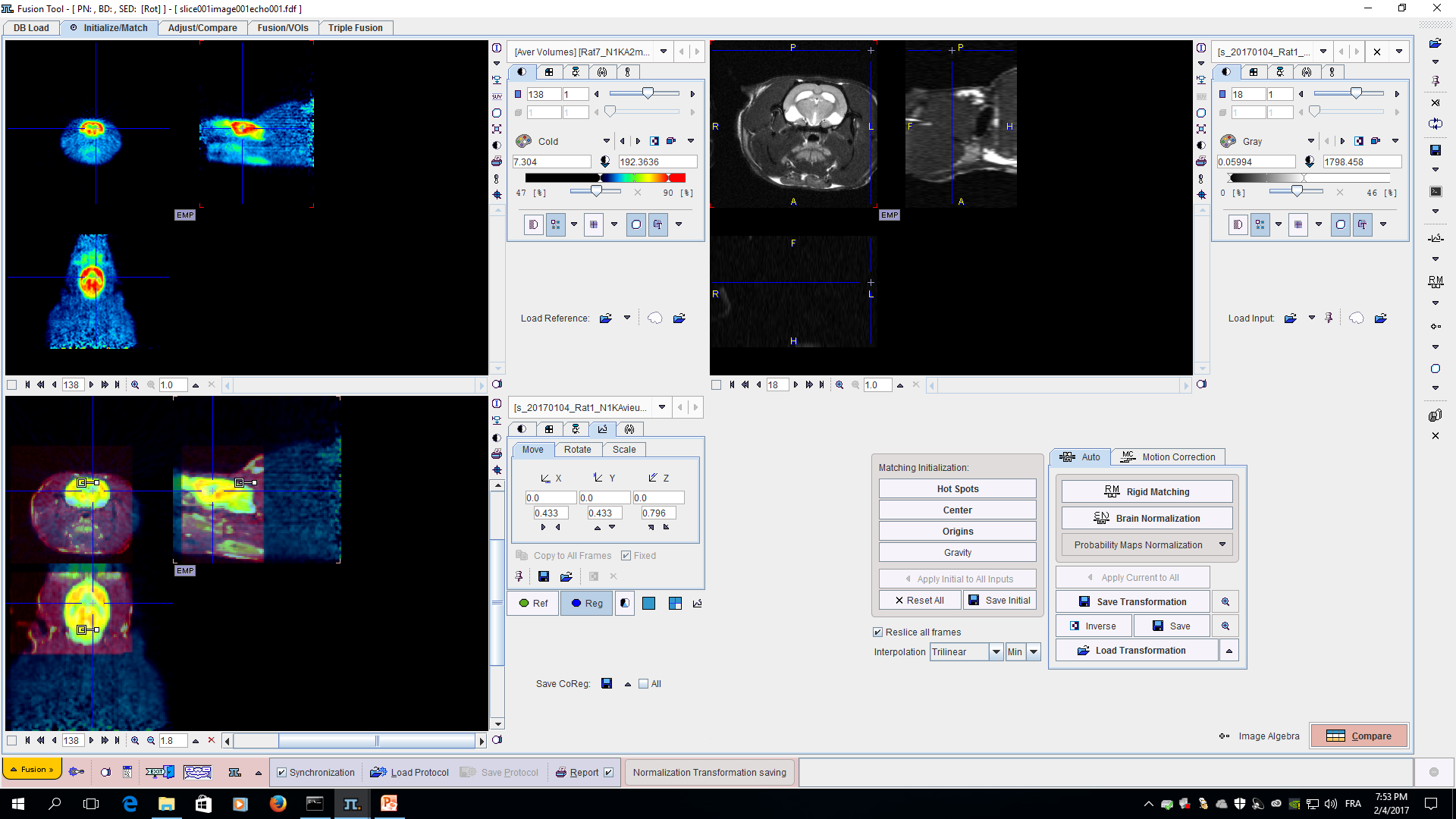
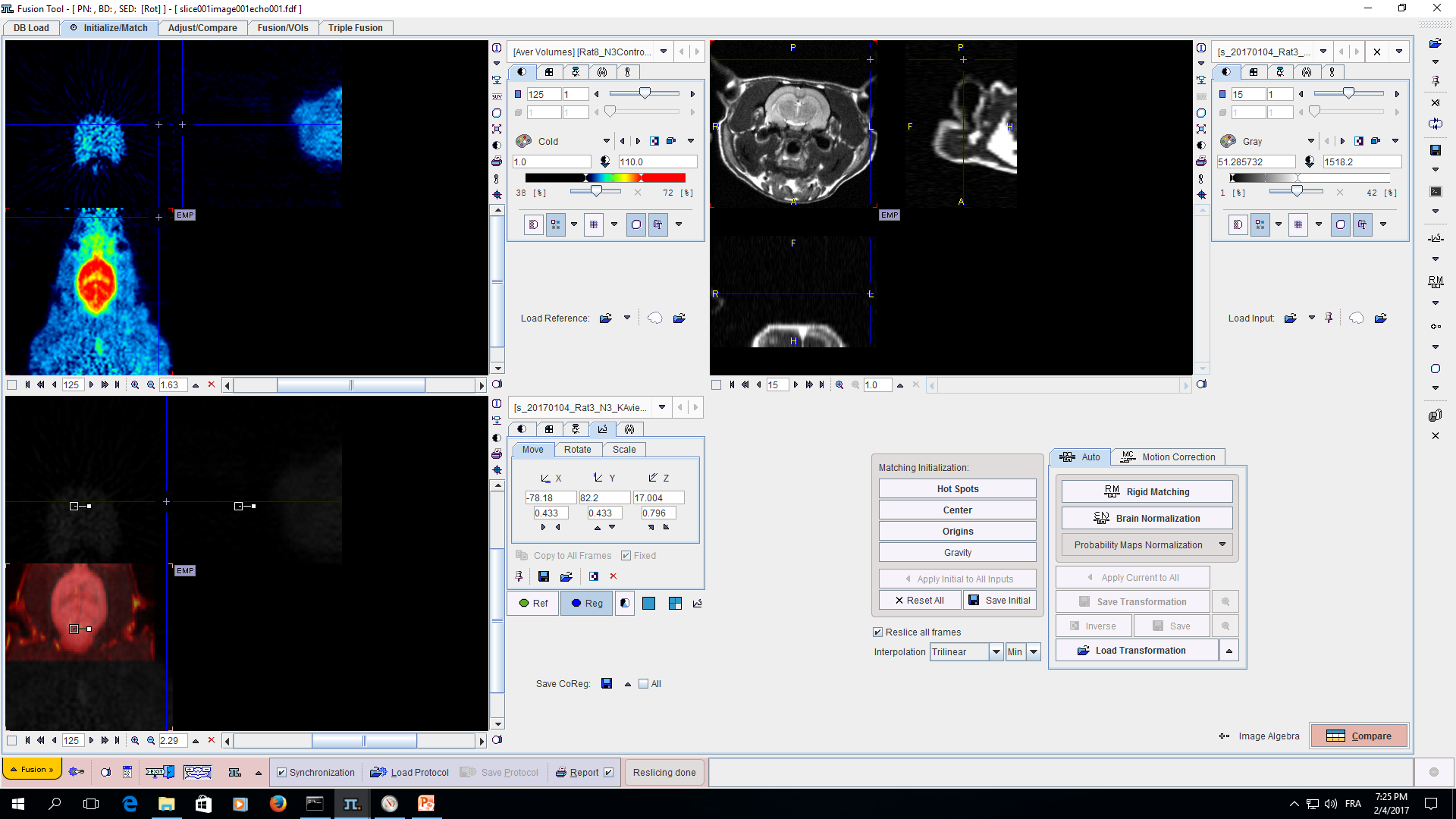
Three male Sprague-Dawley were used, one injected with saline and two with multiple KA injections (3 x 5mg/kg) [6]. 75 days later, when spontaneous seizures started to appear, microPET (Focus 120 ) was performed under isoflurane anesthesia (2.5-3 % in air) for 1 hour with [18F]UCB-H (41 ± 5 MBq IV tail vein) followed by MRI (9.4T Agilent, anatomical T2). 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.

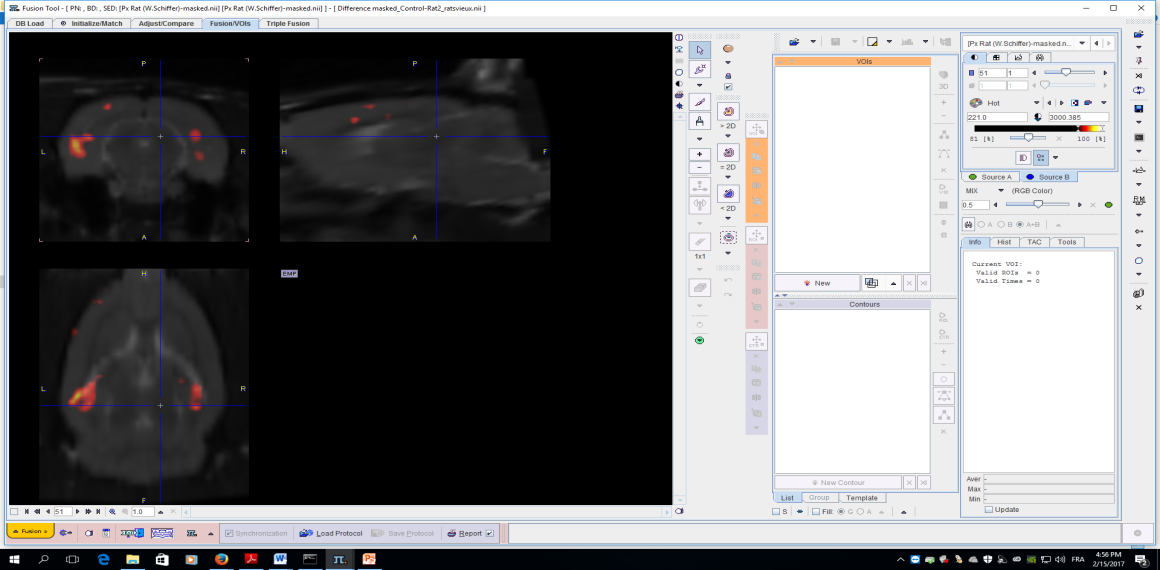
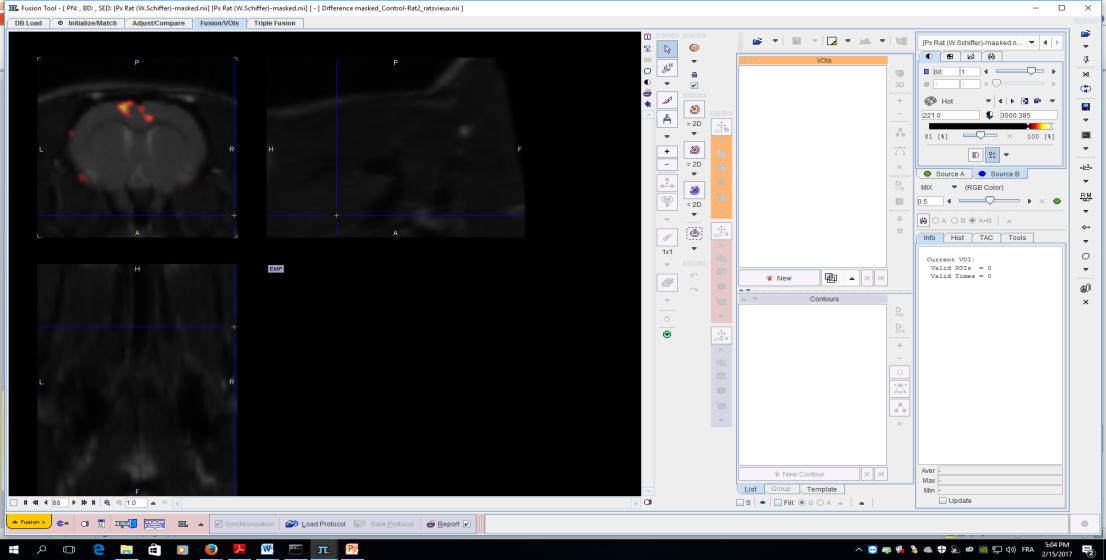
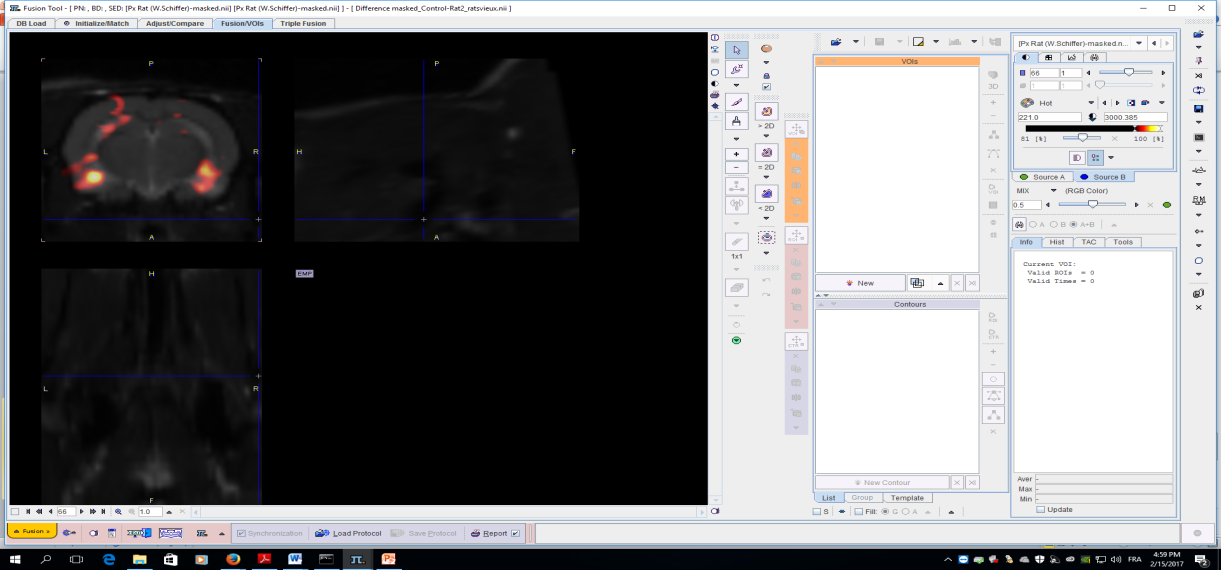
**SHAM**

**KA**



**T2-weighted MRI**

**[18F]UCB-H & MRI**



**(Sham – KA) radiotracer uptake**

**Conclusions**

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 and 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.

**Acknowledgements**

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**References**

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