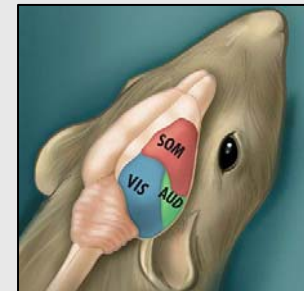
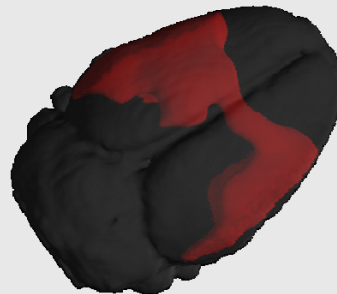
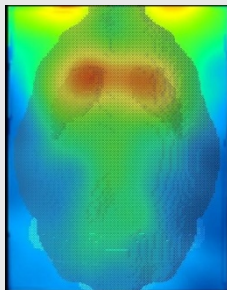


Construction of different radionuclide templates of rat brain and their use on a new statistical parametric mapping analysis protocol for PET studies



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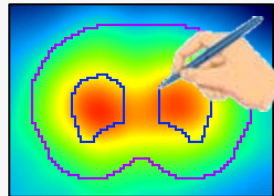
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Introduction

Statistical Parametric Mapping

- **SPM is rarely used in animals**
- **SPM permits automatic analysis avoiding operator variability implicit in the definition of VOIs (Volume of Interest)**



- **Spatial normalization is needed for running SPM analysis of rat brains**
- **Use PET templates for SPM analysis in rat brain studies**

Aim

Develop a protocol to create PET templates

Templates needed for spatial normalization in rat brain images

Normalised rat brain images used for running SPM analysis

- **If we already have PET templates, no MRI would be required for spatial normalization**

Methodology

Eleven *Sprague-Dawley* Rats

- **MRI: Bruker Biospec BMT 47/40 (UCM, Madrid)**
4'7 teslas Spin-eco T2

MRI N = 11



- **μPET: Philips MOSAIC (CIMA-CUN, Pamplona)**

^{18}F -FDG

conscious rats

N = 11

^{11}C -DTBZ

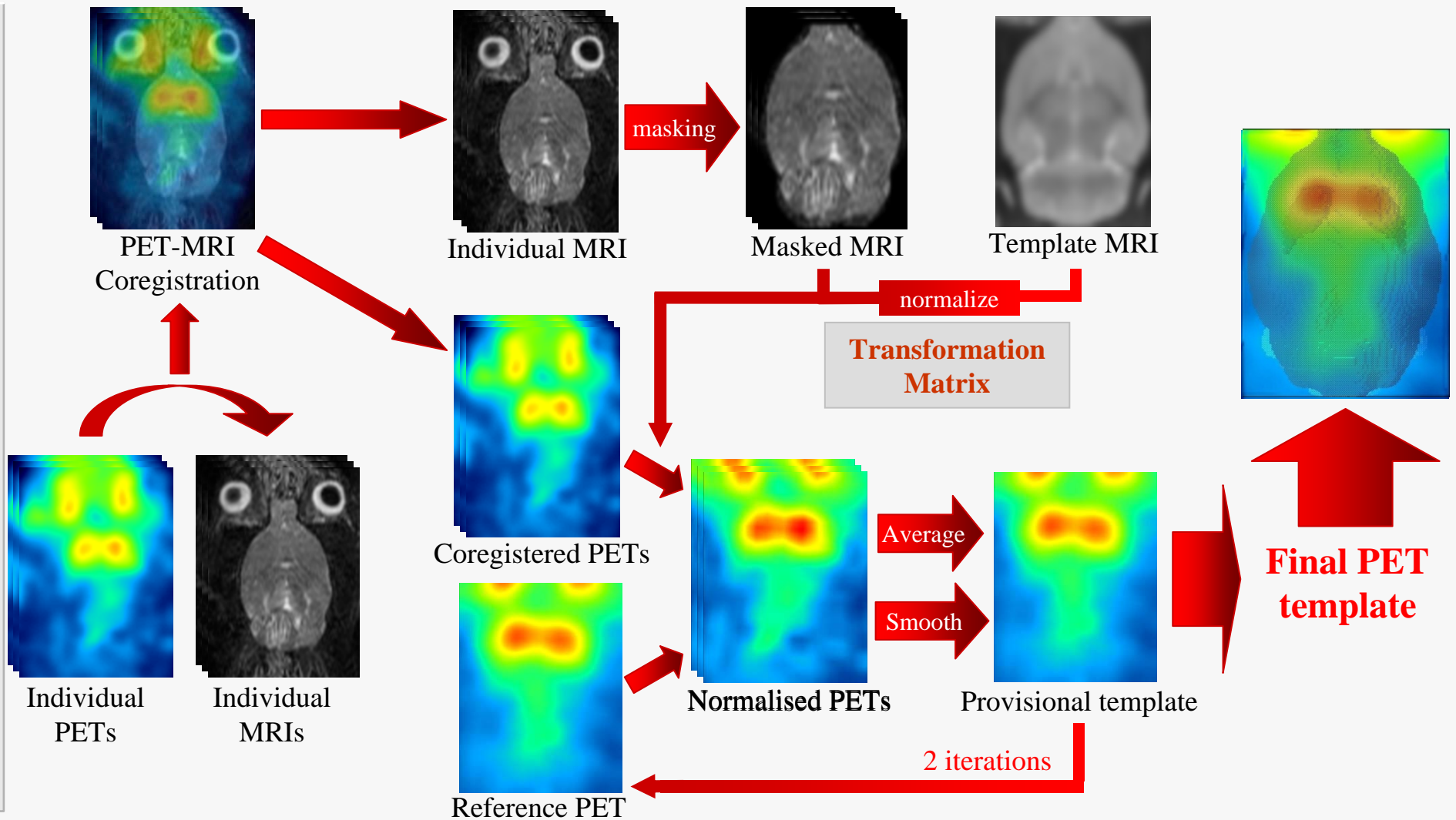
anaesthetised rats

N = 11

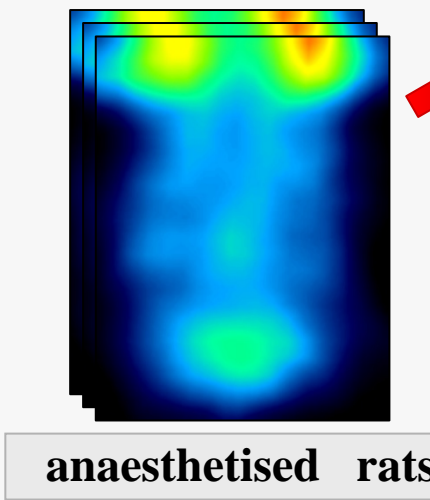
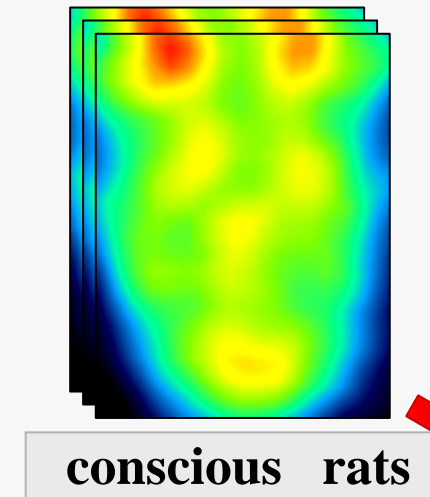
N = 6



Methods: template creation

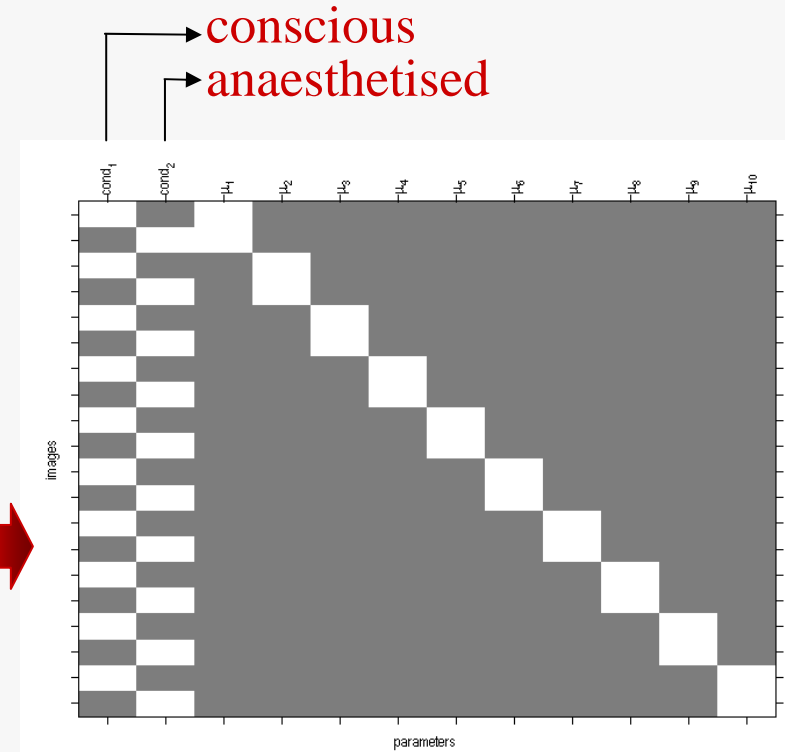


Methods: SPM analysis



$p = 0.05$

Paired t-test



SPM Design Matrix

Design description...

- Design** : Population main effect: 2 cond's, 1 scan/cond (paired t-test)
- Global calculation** : mean voxel value (within per image fullmean/8 mask)
- Grand mean scaling** : (implicit in PropSca global normalisation)
- Global normalisation** : proportional scaling to 50

Results: our templates

^{18}F -FDG template

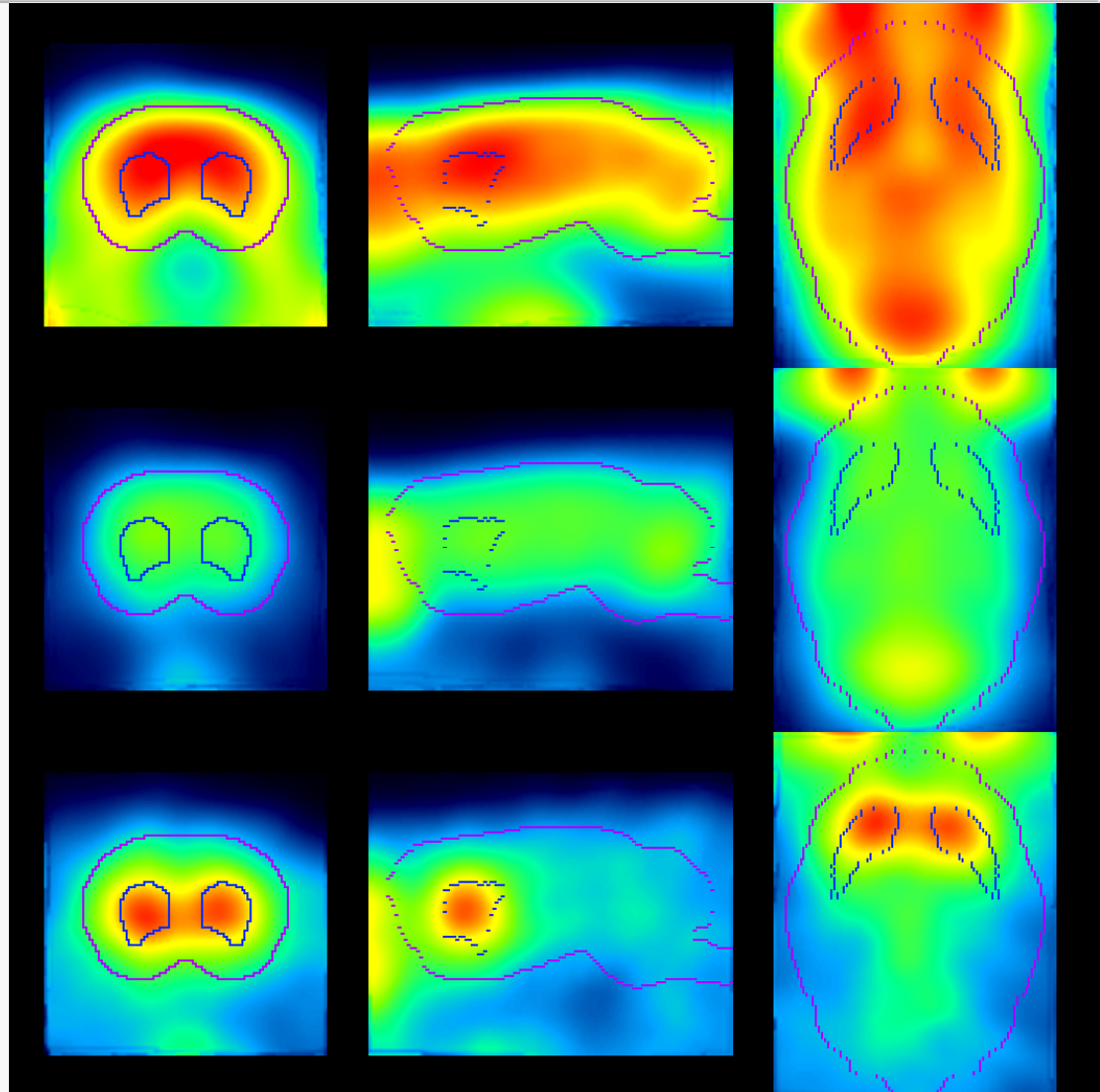
conscious rats

^{18}F -FDG template

anaesthetised rats

^{11}C -DTBZ template

anaesthetised rats



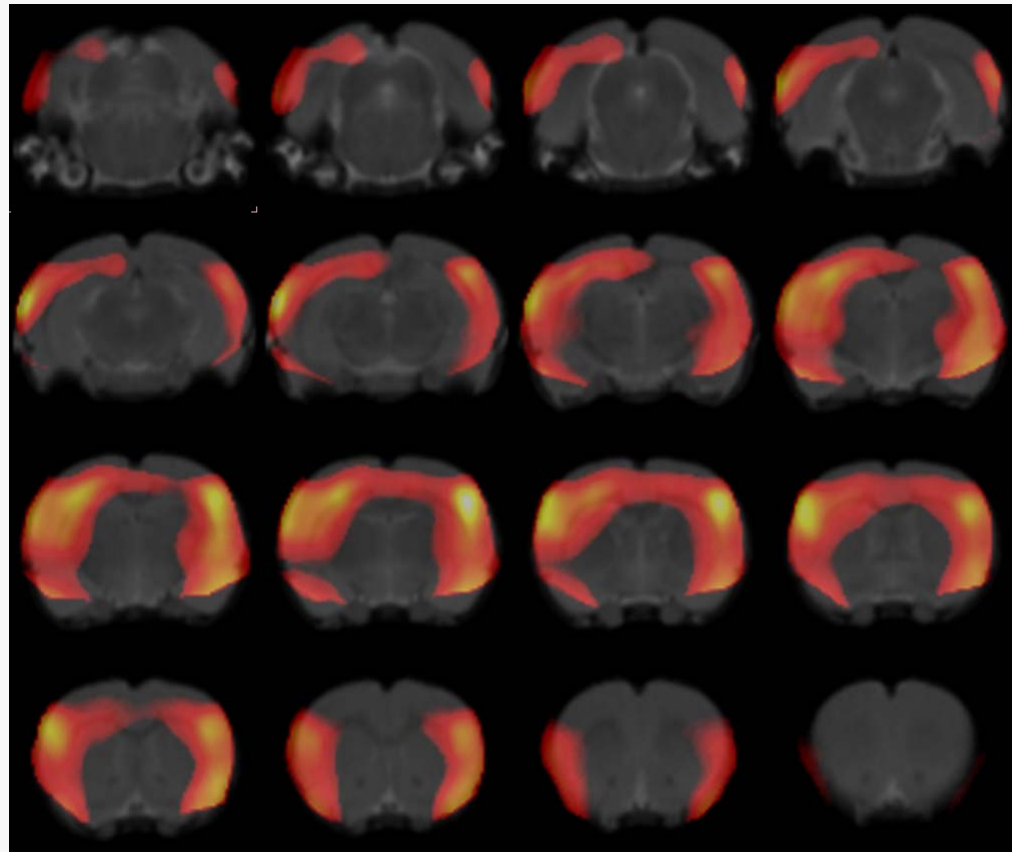
Results: SPM analysis

3D



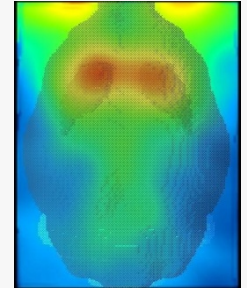
$p = 0.05$

Conscious rats >> Anaesthetised rats



Conclusions

The developed protocol permits the creation of different PET templates of rat brain



The decreased metabolism in the level of cortex in anesthetized animals was assessed using SPM



The results agree with previous data in the literature

