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# Direct evaluation of MR-derived attenuation correction maps for PET/MR of the mouse myocardium

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Attenuation correction (AC) must be applied to provide accurate measurements of PET tracer activity concentrations. Due to the limited space available in PET/MR scanners, MR-derived AC (MRAC) is used as a substitute for gold standard transmission source scans [1]. We compared MRAC to transmission scans to evaluate its performance in mouse myocardium studies.

PET SUV values derived for 10 mice [2] using whole body MRAC maps were compared to those attained using AC maps from a transmission source. 3D FISP was

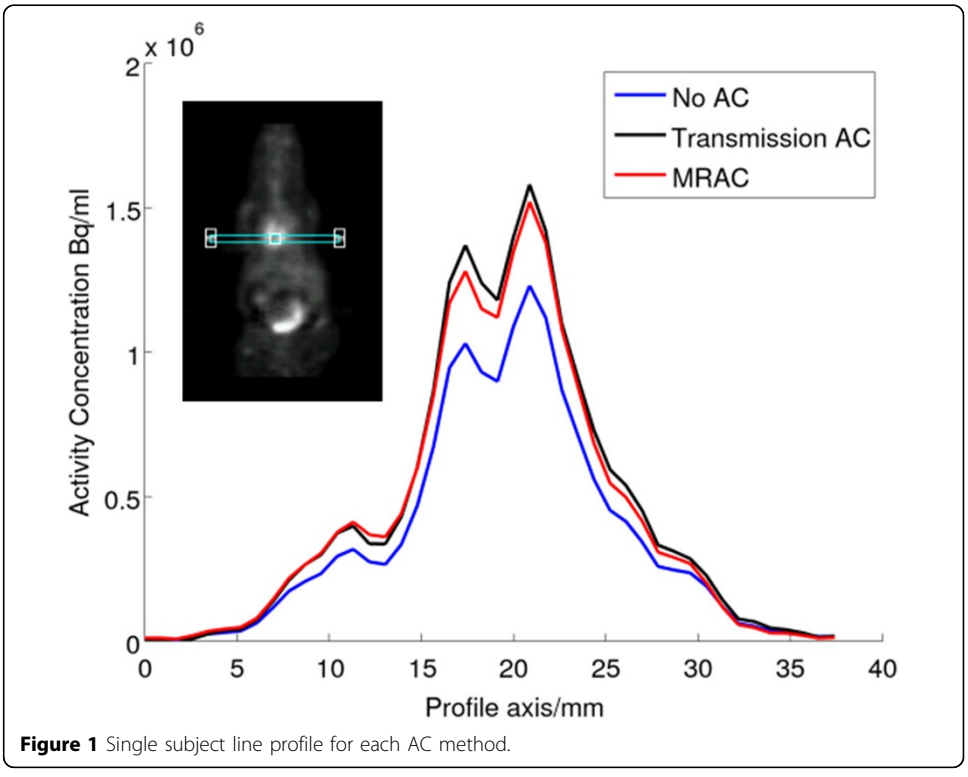


**Figure 1** Single subject line profile for each AC method.

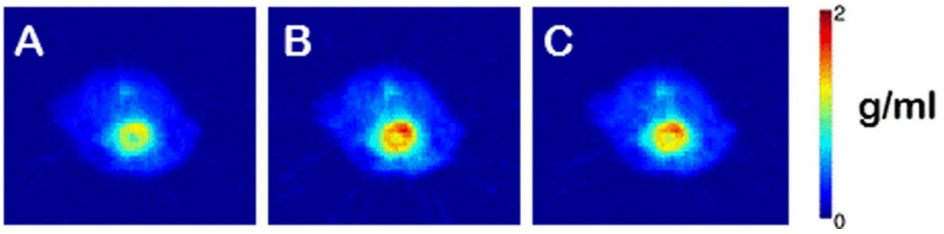


**Figure 2** SUV maps (transverse view) for single subject. (A) No AC applied, (B) Transmission AC, (C) MRAC.

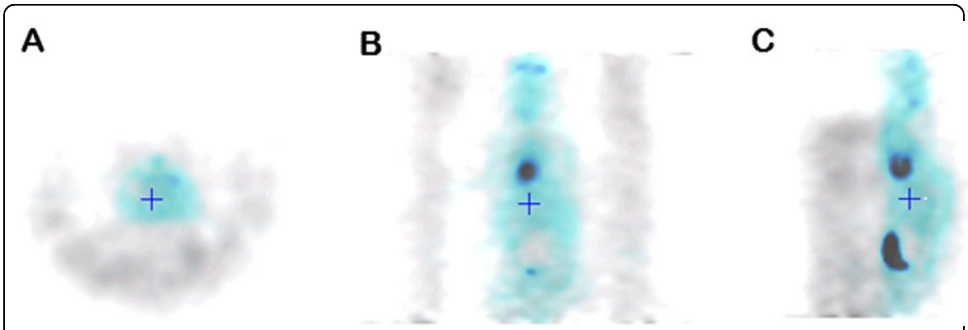


**Figure 3** PET emission (blue) and transmission (grey) fused images showing mouse, coil and bed attenuation, (A) Transverse, (B) Coronal, (C) Sagittal.

acquired using a 4.7T Bruker BioSpec before the mouse was transferred on a standard Bruker animal bed (with single loop surface coil) to the Cambridge split magnet PET/MR [3]. A 10 minute transmission scan ($^{68}$Ge) was performed. Emission data was acquired for 45 minutes following ~25MBq $^{18}$F-FDG administration.

*MRAC comparison* Following co-registration using SPMMouse [4], MR data were forward projected into 3D PET sinograms and thresholded to create an AC map, defined as a single region of tissue with uniform attenuation co-efficient of 0.095cm$^{-1}$. SUV values were calculated from summed PET images (last 20 minutes) and compared on a voxel by voxel basis between images without AC, with transmission source AC, and with MRAC.

A 22.6 ± 0.9% (mean ± SD) improvement in mouse myocardium SUV values (shown in Figures 1 and 2) was seen by applying transmission AC and a 18.5 ± 0.9% improvement using MRAC, compared to not applying AC. The global attenuation correction over the whole mouse body was 20.7 ± 0.7% using transmission AC and 16.5 ± 1.3% using MRAC. Differences of up to 40% (mean: 30.1 ± 4.4%, range: 27-40%) were seen adjacent to the RF coil (see Figure 3).

## Conclusion

A simple, one region MRAC approach provided acceptable AC compared to transmission scanning for myocardial imaging in mice.

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