OPTIMIZATION OF 2-DEOXY-2-[^{18}F] FLUORO-D-GLUCOSE POSITRON EMISSION TOMOGRAPHY THORAX IMAGING OF LABORATORY SMALL ANIMALS

M. L. Soto-Montenegro, J. J. Vaquero, L. Ricon, E. Lage, V. Verdugo, M. Desco
Hospital General Gregorio Marañón, Madrid, SPAIN.

Introduction: The search of oncologic lesions in thorax may be hindered by the high uptake of organs such as the heart or back muscles that prevent the proper visualization of neighbor organs. The aim of this study is to analyze to what extent glucose metabolism can be modulated to obtain an optimal thorax image in mice.

Methods: We have studied the influence of anaesthesia, fasting-time and diet on glucose metabolism. The study includes two groups of 18-22 g SCID mice: A) Control group (N=14) and B) Treated group (N=17). In group A, anaesthesia was Avertine, fasting time was <12 HOURS and fatty acids were not included in diet. In group B, anaesthesia was Ketamine + Diazepam, fasting time was >24 HOURS and extra diet rich in fatty acids was administered 36 hours before positron emission tomography (PET) scan. 2-deoxy-2-[^{18}F] fluoro-D-glucose (FDG) was injected via tail vein (350-550 μCi). Blood glucose was controlled. Following an uptake period of 40 minutes, mice were anesthetized and imaged during 40 minutes in a dedicated small animal PET scanner (1.8mm FWHM). Images were reconstructed using a 3-D OSEM algorithm.

Results: Mice of group A showed high uptake in back muscles and in heart. In group B, 15 of 17 mice did not show cardiac FDG uptake and 13 of 17 mice did not show muscle uptake.

Conclusions: We have shown that it is possible to modify cardiac and muscle glucose metabolism by controlling type of anaesthesia, diet and fasting-time.
However, the procedure is not effective in approximately 15 % of the cases.