POSTER ABSTRACT FRA NUKLEÆRMEDISIN, RIKSHOSPITALET
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Is citrate or heparin the best anticoagulant for obtaining high yield ^{18}F-FDG labelled leukocytes?

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Background: Successful in vitro labelling of human leukocytes with 18F-FDG was first reported by Danpure and Osman in 1992. They used acid-citrate without dextrose as anticoagulant. In vivo studies were not performed. In all subsequent in vivo studies by other groups heparin has been used as anticoagulant. Since heparin - as opposed to citrate - can increase granulocyte activation, it might be advantageous to substitute heparin with citrate in the labelling process.

Materials and methods: Blood samples were drawn from the authors in euglycaemic state. Leukocyte counts varied between 4.8-8.6x10 9/L. Typically 25 mL blood was anticoagulated with isotonic acid-citrate or with heparin. The citrate and heparin samples were thereafter divided in three vials each. Subsequent labelling was performed as a downscaled version of our routine method for 99mTc-labelling of leukocytes, except that the leukocytes were not resuspended/incubated in cell-free plasma but in isotonic citrate, Ringer acetate, physiological saline or phosphate buffered saline (PBS), and that 99mTc-HMPAO was substituted with 18F-FDG incubation at 37 ºC. 27 subsamples were labelled. Student's t-test for paired samples was used for statistical evaluation of labelling yield. Trypan blue exclusion test was used for viability check after labelling.
One of the authors had a whole body PET-scan after reinjection of autologous leukocytes labelled with 18F-FDG by the use of citrate for anticoagulation and PBS for resuspension/incubation

Results and discussion. Resuspension/incubation in isotonic citrate or Ringer acetate yielded only 5-13% 18F-FDG incorporation, and was discarded from further evaluation. The mean labelling yield was 30.2% for citrate anticoagulation combined with NaCl for resuspension/incubation; 31.3% for heparin/NaCl; 36.5% for citrate/PBS; and 38.4% for heparin/PBS. The higher labelling yield with PBS resuspension/incubation compared with NaCl resuspension/incubation was the only statistically significant difference between groups (p=0.036). The trypan blue tests showed more than 99% viable cells. The PET study in the control showed normal leukocyte uptake in spleen, liver and bone marrow, with only low uptake in the brain. Our lower labelling yield compared to the yield reported from studies of
patients with inflammatory diseases are explained by the lower leukocyte counts in normals, and that our in vitro studies were performed with decayed 18F-FDG with low specific activity. In the in vivo study – when fresh 18F-FDG was used – 76% labelling yield was obtained.

Conclusion: ^{18}F-FDG leukocyte labelling yield is equally good whether heparin or citrate is used for initial blood sample anticoagulation. Because of lack of granulocyte activation citrate anticoagulation should be preferred in nuclear imaging practice.

Del 2:

ERFARINGER SÅ LANGT MED ^{18}FDG-MERKING AV LEUKOCYTTER VED PET-SENTERET PÅ RIKSHOSPITALET

Metoden som er beskrevet ovenfor er etablert og hittil benyttet på to pasienter ved PET-senteret på Rikshospitalet. Resultatene vil bli vist og nytteverdi drøftet.