

Simultaneous labelling of two red blood cell populations. Part of a study with the aim to convert blood group A to Blood group O (universal donor).

Birger Tvedt. Nuclear medicine, Radiological department, Haukeland University Hospital

Aim

Nuclear medicine at Haukeland has participated in a large international study aimed at enzymatically converting blood group A to blood group O (universal donor blood). At Haukeland, the Blood Bank, Department of Haematology, and Nuclear Medicine, Department of Radiology was involved.

Materials and methods

The study was performed in healthy volunteers. The Blood Bank enrolled the volunteers to the study, both blood donors and test persons for receiving the labelled blood

The task of nuclear medicine was to perform a simultaneous labelling of two populations of red blood cells, using both Tc 99m to calculate the blood volume and Cr 51 to calculate the survival time.

After accepting to participate in springtime 2006, ahead was a 3 stage 6 months period of preparation time with education, acquisition of equipment, and finally to test the procedure. Knowledge about the double labelling process is scarce, and the learning process was a week in Norfolk, Virginia USA,

To get very specialised equipment, as a centrifuge for thin hematocrit tubes, was also a time consuming task.

Our first test persons were from the staff. To remaining inclusion of volunteers was not a problem.

The study set-up was as follows: First day collected A-blood from a blood donor was treated with enzymes to degrade the group A specific epitopes. The next day the converted donor blood was labelled with Cr 51 (10 - 20 Micro Ci). Then blood from recipient was labelled with Tc 99m (10 – 15 MicroCi). Then they were mixed and injected to the recipient test person.

Results

The study was started end of December 2006.

Numerous blood samples were taken just after the injection for a period of 4 weeks. The blood samples were counted in a Gamma counter for 60 min each. After 14 successful labelling we stopped in May 2007.

Discussion/Conclusion

There were a certain number of problems to resolve. One of them was the difficulty to measure the very small activities we labelled with, just over the background activity. This was difficult both with the cells labelled with Tc 99m and Cr 51

It was an interesting and study to participate in, and an important learning process.

If the hypothesis that enzymatic treatment can reduce the antigenicity of specific red blood cells can be demonstrated, it may revolutionize blood transfusion practice.

The first Scientific results will be published shortly this year.

An important issue to remember is that participating in such studies takes an enormous amount of time.

Acknowledgements

I am thankful to my nearest colleges who took my part of the daily routine job, while I was jobbing with the study.