The small cyclotron MC16F made by Scanditronix (Uppsala, SWEDEN) is a fixed energy (Proton 16 MeV and Deuteron 8 MeV) isochronous cyclotron especially designed for radionuclide production in a hospital. Control systems are composed of programmable controller and operation is quite simplified. With optional radiation shield it is possible to install MC16F in an ordinary room without special radiation shield wall. In the radiation shield, four targets for C-11, N-13, O-15 and F-18 are seated on the target support. Each target may be quickly interchanged. C-11, C-11D, HD-11N, N-13, gas, N-13D solution, N-13D, O-15, CO-15D, H2O-15, F-18 and HF-18 production systems are available. These systems have been developed with the cooperation of the MRC cyclotron unit at Hammarmith Hospital, London and Uppsala University. MC16F cyclotrons and RI-production systems are under construction in Uppsala and will be installed in Johns Hopkins Hospital, USA and Karolinska Hospital, SWEDEN.

As for emission computed tomograph (ECT), there are two approaches, that is, rotating the conventional anger camera head and circular ring detector array type of ECT, which has recently been developed. The former is capable of being used as not only ECT but also conventional two dimensional imaging device and features general purpose nuclear imaging device. In the facilities where conventional camera detector stand and nuclear medicine computer system have already been installed, simple rotating chair is a device to modify them for ECT system. They are capable of acquiring data of more than 10 cross-sectional planes by one scanning, and reconstructing sagittal and/or coronal images. As for circular ring detector array type of ECT, it features higher sensitivity and better spatial resolution than camera ECT. Further more, as it can be used as positron ECT, it is expected to give useful clinical data in accordance with a popularization of cyclotrons. In conclusion, the camera type of ECT is adequate for cross-sectional imaging of a large volume organ such as liver and ring type of ECT is for dynamic measurement such as brain blood flow study.