MEDICAL ISOTOPE APPLICATIONS IN ICELAND

About $12 000 worth of equipment and the services of an expert in the medical applications of radioisotopes were provided by IAEA to the Government of Iceland. The expert, Dr. M. M. Bluhm, of the Western Regional Hospital Board, Glasgow, United Kingdom, completed his seven-month technical assistance assignment in May this year and submitted a report to the Agency on the work accomplished.

Dr. Bluhm's work was primarily concerned with the establishment of a medical radioisotope laboratory at the State Hospital, Reykjavik. His specific tasks included the setting up of the equipment furnished by IAEA for radioactive measurements in medical work, the establishment of techniques for the routine uses of radioisotopes in medicine, and the training of personnel.

The laboratory facilities set up with Dr. Bluhm's assistance consist of four units: one for in vivo counting, one for dispensing radioactive isotopes, one for sample preparation, and one for sample counting. The apparatus installed includes a well-type scintillation counter for small samples, a directional scintillation counter, and Geiger counters of different types. The laboratory is thus well equipped for nearly all the conventional applications of radioisotopes in medicine, except those involving very soft beta-ray emitting isotopes.

Techniques Established

Dr. Bluhm introduced a number of radioisotope techniques at the State Hospital, mainly for diagnostic tests.

Comprehensive thyroid function tests were carried out on 78 persons and normal ranges were established for the Icelandic population. The results were much lower than normal values, probably due to the high iodine content of the Icelandic diet. These conventional tests can be of use in the diagnosis of diseases of the thyroid gland, such as hyper- and hypofunction. A special test for distinguishing between primary and secondary hypofunction, using thyroid stimulating hormone, was carried out on three patients.

A test for measuring the absorption of labelled vitamin B-12 was used on nine patients, as well as on four normal subjects. A method of studying the survival of red blood cells with chromium-51 was used on patients suffering from haematological disorders, who were found to have a shortened red cell survival. Chromium-51 and iron-59 were simultaneously used in a study of red cell formation and destruction and it was felt that the method might be of interest at a later stage of the development of the laboratory.

Other diagnostic tests initiated under the IAEA expert's guidance included fat absorption tests and cardiac output measurements. For the latter, radioiodine-labelled human serum albumin was used and a few promising curves were obtained by external monitoring.

Apart from diagnostic applications, radioiodine was used for the treatment of three patients suffering from thyroid hyperfunction. In view of the small size of their glands, rather small doses were given. At the time of Dr. Bluhm's departure from Iceland, the patients were improving but their condition had not been fully assessed.

The Agency expert also initiated measures for the radiation protection of the personnel of the laboratory and the radiotherapy department of the State Hospital. Monitoring of personnel by direct-reading ionization chambers showed that the precautions observed were adequate.

Other Work

An Icelandic doctor worked with Dr. Bluhm throughout the latter's assignment and thus received the necessary practical training in the isotope applications introduced in the laboratory. One technician was also similarly trained.

Dr. Bluhm's advice and assistance was also sought in connection with a research project concerning Wilson's disease, caused by disorder of copper metabolism. It was felt that the absorption of copper might be prevented if the diet included seaweed containing alginate, because the alginate would retain the copper and reduce its absorption from the gut. The Director of the radioisotope laboratory, Professor David Davidsson, was anxious to investigate this possibility with the help of radioisotopes. In vitro experiments using radioactive copper (copper-64) showed that alginate has a considerable capacity for binding copper. An experiment was also carried out on human subjects, but the results were inconclusive, probably because the specific activity of the radiocopper used was not high enough. It is expected that further experiments to be carried out in the laboratory will yield more definite findings, which may be of considerable importance for the treatment of Wilson's disease.