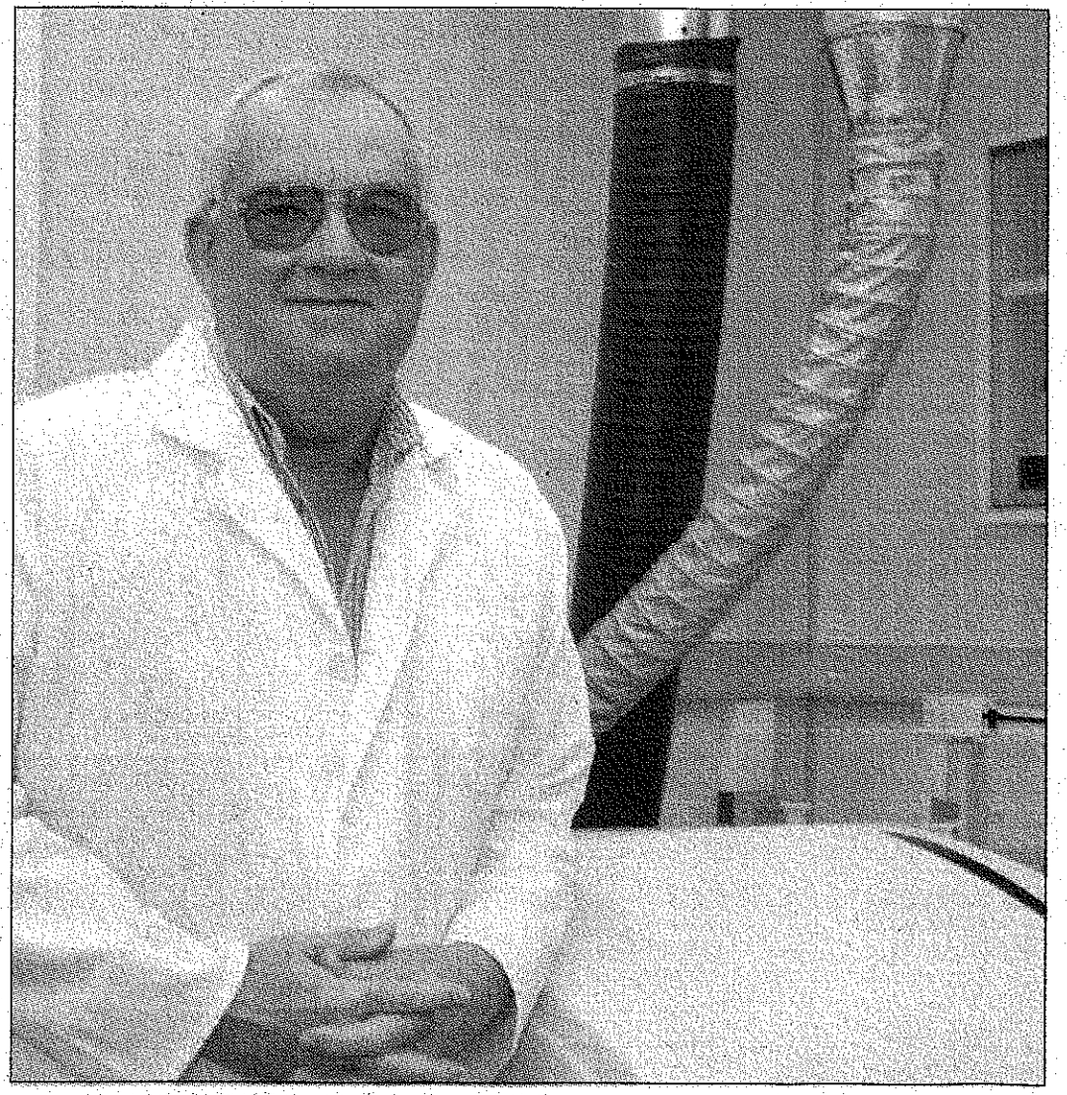
Injections to fight cancer from within



OPTIMISING CANCER TREATMENT: Tommy Gerber, professor of inorganic chemistry at Nelson Mandela Metropolitan University, is determined to improve the diagnosis and treatment of cancer.

CUTTING-EDGE CURE: NMMU inorganic chemistry professor Tommy Gerber is conducting groundbreaking research, which could ultimately minimise the harmful side-effects of existing cancer treatment. **Nicky Willemse** reports on the research

SOMETIME in the near future, cancerous organs will be targeted by special metal compounds, injected intravenously, which will home in on the diseased cells and destroy them internally with radiation – a process resulting in far fewer side effects than current cancer treatments.

Tommy Gerber, professor of inorganic chemistry (chemistry involving metals) at Nelson Mandela Metropolitan University, is one of a handful of scientists worldwide working on this revolutionary cancer treatment.

He has published 146 international papers on his work, which have appeared in top scientific journals on every continent bar Antarctica, and has chaired 11 international conferences on the topic.

"I work with technetium (a metal created by a nuclear reaction) and rhenium. They emit radiation, which is used in the diagnosis and treatment of cancer respectively."

Compounds of these metal isotopes – created by binding them to other atoms and chemical groups, including phosphates, oxygen, nitrogen and sulphur – are chemically programmed to move via the bloodstream to specific organs.

"For instance, if you bind technetium to a phosphate, it will locate in the skeleton."

In the case of technetium, which is used for diagnostic purposes, gamma-radiation is emitted from inside the body when the compound reaches its destination organ – allowing doctors to obtain a nuclear image of the organ, using a special gamma-ray camera.

"Doctors don't have to cut you open to see what is wrong."

Rhenium, which emits beta-radiation, actually irradiates cancer from inside the body. "It allows for localised in-vivo treatment of cancer."

> **"Doctors don't have to cut you open to see what is wrong . . . It allows for localised in-vivo treatment of cancer**

While some technetium compounds are already on the market worldwide, rhenium is still undergoing clinical trials.

"Current cancer treatments – chemotherapy and radiation from outside of the body – have so many side-effects as they damage healthy cells along with cancer cells.

"This technique specifically targets the tumours, leaving the healthy cells unharmed."

As one of the world's leading authorities on rhenium and technetium, and the pioneer of this work in South Africa, Gerber collaborates with scientists all over the world. He has in fact been external examiner of 38 PhD theses from universities all over the world.

At NMMU, Gerber's research has seen him named the Science Faculty's Researcher of the Year for the past two years.

While his work is at the leading edge of medical research, it is also a means to develop his students into recognised scientists. "When my masters and PhD students leave here, they are snapped up by other universities both here and abroad. The research carried out by one of my former PhD students, Irvin Booysen, now at Rhodes University, has already resulted in 18 international publications."

Gerber has collaboratively conducted research with scientists at Oxford University, Oviedo University in Spain, Italy's University of Padua and Germany's Ludwig Maximilian University. He has also rubbed shoulders with four former Nobel Prize winners. "They inspire me to do better."

Born and raised in Port Elizabeth, Gerber completed his BSc at the then University of Port Elizabeth (now NMMU) and his BSc honours and masters degrees in inorganic chemistry at the University of the Free State. He then completed his army training in Pretoria, before being employed at the Council for Scientific and Industrial Research, during which time he completed his PhD through Unisa.

In 1982, soon after completing his PhD, he was offered a lecturing position at NMMU and he introduced his technetium programme shortly afterwards.

"Technetium was a by-product of other processes at the Nuclear Energy Corporation. It was essentially a waste product – so I decided to do something useful with it, following on research initiated in the United States."

In addition to his cancer research, Gerber is also involved with the early diagnosis of Alzheimer's, using similar techniques.