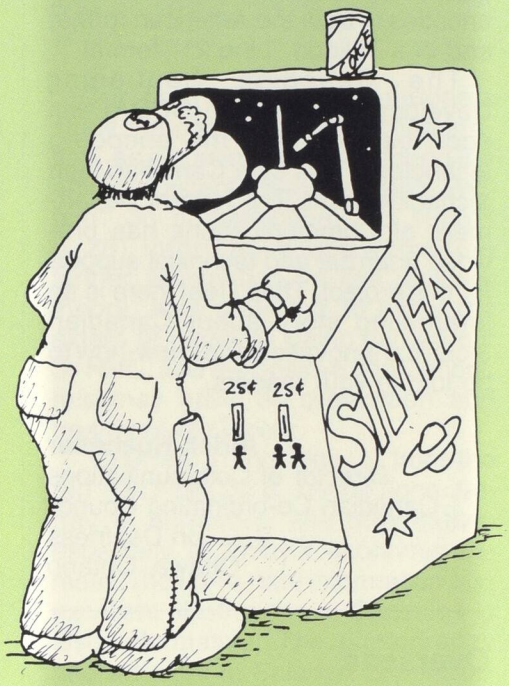
Capsules

Old hands

On the recent flight of the shuttle *Challenger*, Dr. Sally Ride and her colleagues used the Canadarm manipulator to achieve the first capture of a free-floating satellite. Though none of Canadarm's users had been in orbit before, all had intimate knowledge of how the multi-million-dollar space crane worked, including the feel of its controls. The reason? Ride *et al*. have been flying their NASA jets in and out of Toronto, Ontario for the last several years to train.

At the same Spar Aerospace plant that manufactures and assembles Canadarm systems, Canadian engineers have designed and built a sophisticated device called the RMS Simulation Facility, or SIMFAC. SIMFAC comprises a full-size mockup of the aft section of a space shuttle's cabin, complete with Canadarm controls. But replacing the orbiter's thick glass windows are TV screens, fed by a powerful computer. The computer reads data input from the controls and projects a recognizeable view of arm and payload, as seen both through the 'windows' and on any of the orbiter's TV cameras which the astronaut selects. After a few dozen hours of SIMFAC, astronauts who have never gone into space before can handle Canadarm like old hands.



Drugged hybridoma

A hybridoma ('hybrid cancer') is a fusion of a cancer cell with a normal cell that combats foreign substances. Like normal cells, hybridomas produce antibodies, claw-shaped molecules exquisitely tailored to 'lock on' to an invader and tag it for death. And like the cancer cells that comprise their other half, hybridomas produce these antibodies with nonstop efficiency. Now scientists at TRIUMF, a giant cyclotron in Vancouver, have teamed hybridoma antibodies with special isotopes in search of a better way of treating, of all things, cancer itself.

Because they can be custom-designed to home in on specific tissues, antibodies produced by hybridoma cells show promise as 'magic bullets.' These ideal medicines would ferry drugs directly to disease sites, sparing healthy tissue from side effects. The question remains, however: how can drugs ride piggyback on hybridoma-generated antibodies? One answer, according to the TRIUMF researchers, may be to replace some of the antibodies' neutral atoms with radioactive ones.

The technique would work like this: first, clinicians would isolate cells producing anti-cancer antibodies from the blood of a cancer patient. These cells would be fused with a standard line of 'myeloma' or cancer cells, forming hybridomas whose antibodies would be 'specific' to the patient's cancer. Then atoms of some therapeutic isotope would be attached to these antibodies. Churned out in vast numbers by the hybridomas (themselves a kind of disciplined cancer), armed with their deadly radioactivity, and homing in on the patient's cancer, the antibodies would deliver the brunt of their killing power directly to the needed spot.

At present, the TRIUMF research is trying to 'tag' hybridoma antibodies with iodine 123, an isotope just radioactive enough to permit detectors outside the body to trace its route. Once it's proven that the tagged antibodies with their radioactive payload do indeed home in on cancer, the I^{123} will be replaced by a more potent isotope in clinical trials.