Alternative centre for cancer treatment opens in US

Alternative cancer treatments appear to be entering the mainstream in the US. This spring the Gerson Institute opened its first "alternative cancer treatment centre" in Arizona. The centre, which has been licensed by the Arizona Department of Health, employs physicians, homeopathic doctors and nurses. The institute, founded by the late Dr. Max Gerson, uses a therapy that stresses the importance of diet, detoxification and "therapeutic supplementation to reactivate and strengthen the immune system." The Arizona centre joins an existing Gerson facility operating in Mexico.

No scientific proof of the Gerson treatments has been published in a major peer-reviewed journal, although a report on melanoma treatment appeared in *Alternative Therapies in Health and Medicine* in September 1995. Many insurance companies still balk at paying for the treatment. The institute says about 60% of patients treated in Mexico have been reimbursed by their insurance carriers.

Research Update • Le point sur la recherche

"Pacman" enzyme gobbles antibiotics

Canadian researchers have characterized an enzyme that allows some enterococci and staphylococci to resist aminoglycoside antibiotics (*Cell* 1997;89:887-95). The discovery of the enzyme's structure provides vital clues to antibiotic resistance and how to combat it.

The enzyme, aminoglycoside kinase APH(3′)-IIIa, acts like the old
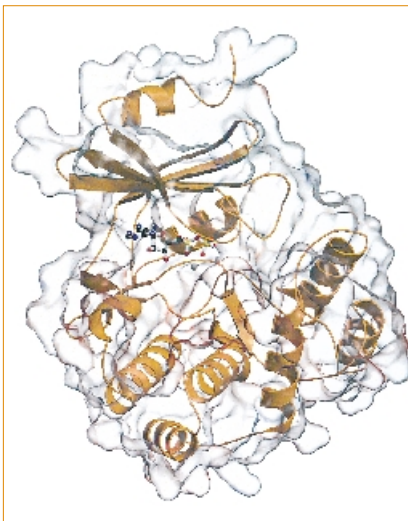
Three-dimensional structure of aminoglycoside kinase APH(3′)-IIIa. The transparent surface shows the shape of the enzyme, the gold ribbon shows the actual fold of the polypeptide chain and the balls and sticks show the ADP molecule, which is used as a cofactor.

arcade game known as Pacman or like a crocodile, says principal investigator Dr. Albert Berghuis, an assistant professor of biochemistry at McMaster University. Normally, when antibiotics are taken to combat bacterial infections "the aminoglycosides should sit on top of the ribosomes [of the bacteria] that synthesize proteins," stopping the synthesis process and killing the bacteria. However, in resistant bacteria "the enzyme captures the antibiotic and modifies it such that the antibiotic does not want to sit on top of the ribosome. So now the antibiotic is a harmless compound — harmless to the bacteria, that is. If we think of the enzyme as a crocodile, we now know the size, shape and strength of its jaws and can thus design a bait to prevent the crocodile from detoxifying antibiotics."

This mechanism is the one involved in resistance to aminoglycosides such as amikacin, streptomycin and gentamicin, which are used mainly in hospitals rather than in the community. Other types of antibiotic resistance involve different mechanisms. The enzyme in question is found on opportunistic enterococci and staphylococci, which have been implicated in some outbreaks of antibiotic resistance in hospitals.

One of the discoveries by Berghuis and his team is the enzyme's startling similarity to eukaryotic protein kinases. Protein kinases are enzymes involved in processes such as growth and blood-glucose regulation, and accidental mutations in these enzymes often lead to cancer. The similarity between enzymes involved in antibiotic resistance and those involved in cancer implies that aminoglycoside kinases are not new enzymes, created by our misuse of antibiotics, but are more than a billion years old. Berghuis believes that the enzymes are remnants of ancient biologic warfare waged long before human evolved.

"What has happened over the last 50 years through the overuse of antibiotics is that we have carefully selected for bacteria that still retained these left-over defence systems," Berghuis explained. "These resistant strains are now displacing most 'normal' bacteria in our ecosystem." — *C.J. Brown*

Chickenpox running scared

A vaccine against chickenpox is receiving its first trial in Canada, with 3 hospitals taking part in a manufacturer-sponsored trial of the vaccine's safety. Dr. Francisco Diaz-Mitoma of the University of Ottawa, a prin-