A new class of drugs called ampakines can boost the memory as well as treat jet lag, attention deficit hyperactivity disorder and even Alzheimer’s disease. The drug, known as CX717, works by boosting chemicals that allows information to flow from one part of the brain to another. It boosts the brain chemical glutamate that makes learning and recall easy.

In a pilot trial conducted in the UK, 16 healthy participants aged between 18 and 45 were given the drug. The volunteers had a full night’s sleep and then were given a range of tests to assess memory, attention, alertness, reaction time and problem solving.

The participants took the pill at 11pm and were tested at 1am, 3am, 5am, and 9am. The tests were repeated so that scientists could compare how the participants performed on different amounts of the drug or placebo pill. The results showed that the lowest dose of ampakine improved the ability to stay awake and the more the participants took the drug, the better they performed. The participants’ heart rate and brain activity were measured too. They did not suffer from any side effects like jitteriness that would come along with other stimulants such as caffeine and amphetamines.

The pilot trial was led by Dr. Julia Boyle and colleagues from the University of Surrey, UK. “As you get tired, communication between the brain cells begin to fail. When you take the pill, the communication is better. What it’s doing is causing neurons to communicate with each other a little better,” she said.
Dr. Roger Stoll, chairman of Cortex, a Californian-based company that owns the drug, CX717, says: “The results from this study are very encouraging. This study supports our developmental approach to CX717. We plan to conduct pilot studies in a variety of brain disorders that might benefit from ampakine pharmacology including Alzheimer’s disease, attention deficit hyperactivity disorder and sleep disorders.”

Professor Barbara Sahakian, from the Clinical Neuropsychiatry Department at Cambridge, UK said: “There had been a lot of promise with the ampakines and people are very excited about them.” She said it could be useful for other medical conditions that impaired memory and concentration. However, she warned against recreational use of the drug. “I think it is something we have to be concerned about because some of the people taking these drugs, their brains are still developing and we do not know the long-term consequences.”

The research project is still in its infant stage, it could take some years before the drug is widely used.

About Cortex Pharmaceuticals Inc
Cortex Pharmaceuticals Inc engages in the discovery, development and commercialization of a novel technology called Ampakine® compounds, which have already shown proof-of-principle efficacy in human clinical trials. These compounds enhance memory and cognition and impact disorders ranging from early childhood diseases such as autism, fragile X syndrome and attention deficit hyperactivity disorder to age-associated memory impairment disorders as seen in older populations, such as Alzheimer’s disease. These drugs are also useful in the treatment of psychiatric disorders such as schizophrenia and depression.
Swiss researchers experimented with a vaccine against nicotine that helps smokers quit the habit. Zurich-based Cytos Biotech AG has designed a vaccine that uses part of a protein from a virus, genetically engineered to attract an immune system response to nicotine. Smokers generate antibodies that neutralize the nicotine after being vaccinated.

“They don’t feel that they have to take a cigarette to feel better. The data clearly suggest that antibodies against nicotine are effective in helping people quit smoking. I believe the vaccine approach has the potential to dramatically alter the way we will treat smoking addiction,” said Dr. Jacques Cornuz from the University Hospital of Lausanne.

Smoking is very addictive and quitting requires a great effort. According to the World Health Organization (WHO), smoking is the single largest cause of cancer and heart disease. It kills approximately 5 million people a year.

Researchers at Cytos Biotech AG tested 341 smokers aged between 18 and 70. All of them had been smoking for at least three years. Two thirds of them received five doses of the vaccine, at varying doses, over four months. One third of them received placebo. All of them were counselled about quitting smoking. Then, the team tested the volunteers for antibody response. All the volunteers were then asked to give up smoking. After eight weeks, those who produced the most antibodies were also the most likely to be able to stop smoking. 57% of them stopped smoking. 31% of those in the placebo group were able to stop smoking too.

The chief executive officer of Cytos, Wolfgang Renner said “We were extremely pleased about the results, as the data in the high-responder group are better than anything we have seen so far. The clear correlation between antibody levels and the clinical effects greatly supports us in the further development of this vaccine.”

Mr Renner went on to say that the next stage for the company is to increase the vaccine dosage and the number of injections so that more antibodies are created. Although side effects included a flu-like symptoms on the day of the injection, all these effects subsided within a day.

The company is aiming to get the vaccine on the market by 2010. A much bigger phase-three trial with higher dosages would take place in 2007.
Singapore

NANOTECH BREAKTHROUGH FOR SINGAPORE RESEARCHERS

Researchers at the Singapore Institute of Bioengineering and Nanotechnology (IBN) have developed a new method to control both size and morphology of nanoparticles. The technique, called fluorocarbon-mediated synthesis, is able to produce nanoparticles of 50–300 nm and tunable pore sizes of 5–30 nm.

“This is the first time that we have been able to control both the size of the particles, as well as the pores. Previously scientists have been successful in only one of the two,” said Prof. Jackie Ying, Executive Director of IBN, who worked on the project, with Research Scientist, Dr. Yu Han.

Professor Ying and Dr. Han used a simple wet-chemical technique, to create a variety of nanoparticles with enormous surface areas, and well-defined pore sizes and structures. “This technique involves the use of two types of surfactant,” said Dr. Han. “The tri-block copolymer surfactant act as the supramolecular template for the mesostructure, and did not consider using another surfactant for controlling the particle size and morphology.”

IBN’s breakthrough was recently featured in a leading chemistry journal, Angewandte Chemie. A US patent has been filed on the invention and already the institute is in discussion with pharmaceutical companies on using these nanoparticles for various applications. IBN hopes that their invention will be commercialized within the next two years.

One important application is for the production of pure chiral drugs. While these chiral drugs exist in “left-handed” and “right-handed” molecules, only one molecule results in a therapeutic effect. Current methods use catalysts to selectively synthesize the preferred molecule. However, these catalysts exist in a liquid phase, making it difficult for them to be separated and reused. To solve this problem, Prof Ying’s group has developed a novel method, using the nanoparticles created by their technique, to immobilize the catalysts. This turns them into a solid form, which can be easily recovered and reused.

Chiral drugs currently make up over a third of the pharmaceutical drugs sold worldwide, generating US$143 billion in sales in 2003. By simplifying the manufacturing process, IBN’s method could result in huge cost-savings for the drug manufacturing process.

These nanoparticles could be used in a range of other applications, which involve therapeutic treatments like targeted drug delivery or gene therapy.

“Ultrafine mesoporous particles would be very useful in catalysis and gas adsorption, since they would provide greater pore accessibility and facilitate molecular diffusion. Because of the presence of nano-sized and tunable pores, these porous nanoparticles could also act as the best matrix for the synthesis of quantum dots and magnetic nanoparticles in functional materials and bioimaging applications. They could also act as carriers for drugs, genes and proteins for novel biomedical applications, since the pore size matches the dimension of these moelcules very well,” said Dr. Han.

When asked about what future research work is being carried out on their invention, Dr. Han replied, “We are combining the porous nanoparticles with various catalytically active ligands, to prepare catalysts for various important reactions in pharmaceutical synthesis.”
Three scientists from Hong Kong Polytechnic University have created a drug that can treat liver cancer and prolong a patient's life for a few months. The research took three years to complete. The drug is called BCT-100. It will begin clinical trials in May 2005. The clinical trials will be conducted at Queen’s Mary Hospital on about 30 patients. The University of Hong Kong’s center for the study of liver disease will participate in the trials.

Liver cancer kills approximately 1500 patients in Hong Kong yearly. There are about 260,000 liver cancer sufferers in the mainland. This new drug marks the first step in finding a more permanent cure for liver cancer.

The new drug is made of a natural enzyme. An edible bacterium, called Baccillus subtilis, creates the enzyme that can break down arginine (an amino acid). Arginine is important for cancer cells to survive. Degrading arginine would slow down the proliferation of liver cancer cells. At the same time, the enzyme does not affect normal cells.

The scientists have tried the drug on two terminally ill patients. One of the patient’s condition improved significantly after seven injections. The second’s patient’s condition fluctuated. Neither of the patients suffered any side effects.

More about liver cancer
While there are other types of liver cancer, the most common form in adults is called hepatocellular carcinoma. It begins in the hepatocytes, the main type of liver cell. About 3 out of 4 primary liver cancers are of this type. The risks factors for liver cancer are as follows: chronic liver infections (hepatitis); cirrhosis of the liver, aflatoxin; being male; positive family history and lastly old age. Symptoms of liver disease are as follows: pain in the upper abdomen on the right side (the pain may extend to the back and shoulder); swollen abdomen; weight loss; loss of appetite; jaundice; nausea; vomiting and fever. Treatment will vary according to individual conditions. Some of the possible treatments are surgery, liver transplantation, chemotherapy and radiation.