


**REPORT TO
PHYSICIANS**
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 THE UNIVERSITY OF TEXAS
**MD ANDERSON
 CANCER CENTER**
Making Cancer History™

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 Protocols**

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MD Anderson Oncology

Pancreatic Tumor Team Studies Disease Mechanisms, Reverses Conventional Approach

by Dawn Chalaire

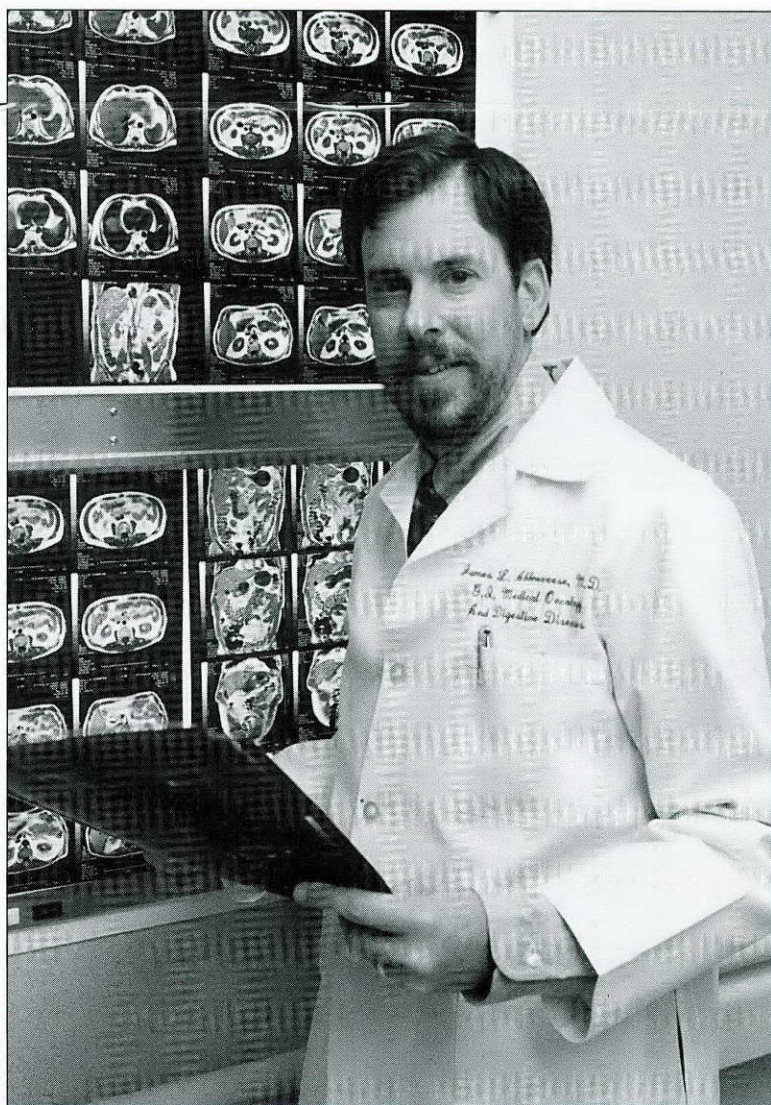
With the tenacity of curious detectives and a willingness to challenge conventional wisdom, physicians and researchers at The University of Texas M. D. Anderson Cancer Center are working to understand and undermine pancreatic cancer cells' deadly behavior.

"I think the most important thing we've tried to do in the last few years is put together a working hypothesis of why pancreatic cancer behaves the way it does. By taking a lot of the known information about the disease and trying to fit as much of that information as we can into a conceptual framework about the cancer, it allows us to decide which of a large number of new therapies that may be available to test in this disease might make the most sense," said James Abbruzzese, M.D., chairman of the Department of Gastrointestinal Medical Oncology and Digestive Diseases.

"Right now, however, we're just not at a point where we understand enough about the cancer to be able to cure it," he said.

(Continued on next page)

Dr. James Abbruzzese, chairman of the Department of Gastrointestinal Medical Oncology and Digestive Diseases, collaborates on pancreatic cancer cases with about 25 physicians, nurses, and researchers in eight departments who are members of the Pancreatic Tumor Study Group.



Pancreatic Tumor Team Studies Disease

(Continued from page 1)

Most of what researchers do know about pancreatic cancer is not encouraging. The overall five-year survival rate for all stages of the disease is less than 1%, and most patients die within one year of diagnosis.

"Pancreatic cancer is a unique solid tumor, and it requires that multiple physicians work together in the treatment of a patient," said Douglas Evans, M.D., a Department of Surgical Oncology associate professor.

Drs. Abbruzzese and Evans are two of 25 physicians, researchers, and nurses in eight departments at M. D. Anderson who make up the Pancreatic Tumor Study Group (PTSG). The group includes a well-established multimodality program for the diagnosis, treatment, and follow-up of patients with pancreatic cancer and a basic research program.

The location of the pancreas and its proximity to other organs make pancreatic cancer difficult to diagnose and stage. At M. D. Anderson, the clinical staging of tumors as resectable, locally advanced, or

metastatic is based on a physical examination and computed tomographic scans. Dr. Evans credits Chusilp Charnsangavej, M.D., and the Department of Diagnostic Radiology with providing him and other surgeons at M. D. Anderson, including Jeffrey Lee, M.D., Peter Pisters, M.D., and Nicholas Vauthey, M.D., with the data necessary to identify patients who will benefit from surgery.

The standard treatment for tumors that are determined to be resectable is pancreaticoduodenectomy followed by chemotherapy and radiation therapy; however, studies conducted at M. D. Anderson convinced PTSG physicians that administering radiation and chemotherapy before surgery is a more effective strategy.

"People can handle radiation and chemotherapy much better before surgery than after," Dr. Evans explained. "Not everyone recovers from the operation in a timely fashion. A sizeable number of patients will have a delayed recovery, due to either complications or just slow recovery, so that they will never be able to receive postoperative therapy."

Minimizing the toxicity sometimes associated with preoperative chemoradiation is important to the success of the surgery-last strategy. A unique treatment option developed by Nora Janjan, M.D., and others in the Department of Radiation Oncology allows for less radiation before surgery and shortens the overall treatment course. To this preoperative radiotherapy, she adds intraoperative electron beam radiation administered to the bed of the resected pancreas at a dose of 10 or 15 Gy, depending on the status of the retroperitoneal margin of resection.

According to Dr. Evans, current multimodality protocol-based treatment programs for patients with localized pancreatic cancer combine gemcitabine and external-beam irradiation or the use of the matrix metalloproteinase

Pancreatic Cancer Protocol Options Include Gemcitabine and Marimastat

Clinical trials currently in progress at The University of Texas M. D. Anderson Cancer Center include the following for patients with pancreatic cancer.

- Phase I/II trial of intratumoral injection with ONYX-015 by endoscopic ultrasound, alone and in combination with gemcitabine, into unresectable tumors of the exocrine pancreas (DM98-063).
Physician: James L. Abbruzzese, M.D.
ONYX-015 is an attenuated chimeric human group C adenovirus that efficiently replicates in and lyses tumor cells deficient in *p53*. Eligible patients will receive injections of ONYX-015 directly into the primary pancreatic tumor on days 1, 3, and 5 of treatment and then weekly for two months. They will also receive weekly 30-minute intravenous infusions of gemcitabine for four weeks beginning on day 36. Participants in this study must be more than 18 years old and have tumors that are amenable to biopsy and direct injection by endosonography. A Karnofsky performance status ≥ 60 and life expectancy of three months or



Dr. Peter Pisters is one of several surgeons who perform the 60 or more pancreaticoduodenectomies done at M. D. Anderson Cancer Center annually.

inhibitor marimastat (designed to prevent cancers from building the blood vessels necessary for tumor growth) and are administered before or after pancreaticoduodenectomy.

Tumor extension into the nearby superior mesenteric vein or superior mesenteric-portal vein confluence was once considered a contraindication to pancreaticoduodenectomy, but a technique developed at M. D. Anderson for replacing involved sections of these veins with a section of the internal jugular vein has made successful complete resection possible for many of these patients.

Although sometimes overshadowed by the publicity surrounding new treatments, the successful

more are required, along with preserved liver and hematologic function.

- A phase III randomized study of pre- and postchemoradiation 5-FU versus pre- and postchemoradiation gemcitabine for postoperative adjuvant treatment of resected pancreatic adenocarcinoma (RTOG97-04). *Physician: Nora Janjan, M.D.*

Patients in this study will receive their first dose of 5-fluorouracil or gemcitabine three to six weeks after a potentially curative resection for stage T1–3, N0–1 adenocarcinoma of the pancreas. Subsequent evaluations will be every six months for three years and then yearly. Participants must be able to maintain adequate oral nutrition. Exclusion criteria include recurrent disease, prior radiation therapy to any site, previous chemotherapy, and any history of active malignancy within five years of study entry.

- Multi-institutional phase II study of pre-operative rapid-fractionation external-beam radiation therapy and concomitant Gemzar (gemcitabine) for patients with resectable adenocarcinoma of the pancreatic head (ID98-020). *Physician: Douglas B. Evans, M.D.*

To be eligible for this study, patients must have a localized, potentially resectable tumor of the pancreatic head

or uncinate process. Patients will be given seven weekly 30-minute intravenous infusions of Gemzar combined with 10 doses of radiation therapy over two weeks, beginning four days after the first Gemzar dose. Surgery will follow two to four weeks after the last dose of Gemzar. A Karnofsky performance status ≥ 70 is required, along with the ability to maintain adequate oral nutrition. Radiation shielding is limited to about two thirds of any functioning kidney.

- A double-blind, placebo-controlled, minimized phase III study comparing marimastat to placebo as adjuvant therapy in patients with resectable pancreatic cancer (ID97-211). *Physician: Peter W. Pisters, M.D.*

Beginning four weeks after successful resection of stage I–III pancreatic carcinoma, patients in this study will take marimastat or placebo capsules at home twice a day, with or after morning and evening meals. Return visits will be scheduled every three months for two years and then every six months. The presence of gross residual disease or definitive evidence of disease progression following surgery will preclude study participation. Prospective patients must not have received previous systemic treatment for pancreatic cancer, including chemotherapy, immunotherapy, or matrix metalloproteinase inhibitors.

- Phase I dose-finding study of prolonged infusion of L-778,123 in patients with cancer. *Physician: James L. Abbruzzese, M.D.*

L-778,123 is a farnesyl transferase inhibitor that may inhibit the ras pathway and consequent cellular proliferation within tumors. In this study, eligible patients with histologically documented solid tumors (preferably colorectal or pancreatic cancer) will receive L-778,123 intravenously at one of several possible doses daily for two to four weeks. Participants must agree to have an in-dwelling venous catheter and must have blood lab values within normal limits. A history of serious allergies to drugs or latex precludes study participation, as does prior high-dose chemotherapy with stem-cell rescue/bone marrow transplantation or prior radiation to more than 25% of bone marrow. ●

FOR MORE INFORMATION about these clinical trials, physicians or patients may call the M. D. Anderson Information Line. Those within the United States, call (800) 392-1611; those in Houston or outside the United States, call (713) 792-6161. Visit the M. D. Anderson Cancer Center clinical trials Web site at <http://www.clinicaltrials.org> for a broader listing of treatment research protocols.

execution of standard therapies is also critical. Dr. Evans cites an article in the March 1999 issue of *Surgery*, which reported that the majority of pancreaticoduodenectomies in the United States are completed at hospitals performing less than two such procedures per year and have an average perioperative mortality rate of 16%. At M. D. Anderson, where approximately 60 pancreaticoduodenectomies are performed each year, the mortality rate is 1%.

According to Dr. Evans, experience also accounts for the extremely low complication rates achieved by gastroenterologists Sandeep Lahoti, M.D., and Isaac Rajjman, M.D., who

perform ultrasound-guided fine-needle aspirations and endoscopic retrograde cholangiopancreatography and insert stents to relieve bile duct obstruction and jaundice.

For patients whose tumors are unresectable, determining which protocol will give the most benefit requires thoughtful application of the PTSG's working hypothesis.

"To test our model, we are designing experiments in the laboratory and also trying to employ some very specific treatments that will help us understand if our thinking about pancreatic cancer is in fact correct," Dr. Abbruzzese said.

It was the recognition of an aberration of the *p53* gene in pancre-

atic cancer that led researchers to try a new and very promising treatment approach using endoscopic ultrasound. The technique, developed in part by Dr. Lahoti, allows doctors to image the pancreas through the stomach or duodenum and inject a virus engineered to kill only those cells that do not produce the p53 protein directly into the tumor using a separate channel of the endoscope.

"If it's successful," Dr. Abbruzzese said, "I think this opens up a whole new approach to pancreas cancer, including the possibility of doing gene therapy and other things which have, so far, not been attempted."

Another possible avenue for gene
(Continued on next page)

Pancreatic Tumor Team Studies Disease

(Continued from page 3)

therapy stems from the discovery of a factor that appears to be activated in pancreatic cancer. Paul Chiao, Ph.D., an assistant professor in the Department of Surgical Oncology, recently discovered that the transcription factor NF- κ B regulates a large number of genes in the cancer cell, including those that relate to the aggressive biology of pancreatic cancer.

"We think that NF- κ B is an important controlling factor in pancreatic cancer. We are trying to target ways of turning off NF- κ B or turning off other pathways that might lead to its activation," Dr. Abbruzzese said.

M. D. Anderson is also participating in ongoing multi-institutional studies to test the effectiveness of drugs developed to inhibit the protein ras, which is mutated in 80% to 85% of patients with pancreatic cancer.

"We're going to know within the next three to four years whether this concept of developing a drug directly and very specifically to inhibit a certain target is going to pay off," Dr. Abbruzzese said.

While metastatic pancreatic cancer continues to be a very difficult cancer to treat, palliative therapies have improved through the use of gemcitabine, which has also been shown to lengthen survival in some patients. Two new trials scheduled to open within the next few months involve combining gemcitabine with one of two antibodies, Herceptin or C-225.

"Both are promising trials in the laboratory, and we're working on finalizing the protocols," Dr. Abbruzzese said. "Even though it's still a very, very difficult and lethal disease, there are many things that can be done to help patients with pancreatic cancer that can lead not only to improvements in quality of life but also to dramatic extensions in survival." ●

FOR MORE INFORMATION, contact Dr. Evans at (713) 794-4324 or Dr. Abbruzzese at (713) 792-2828.

Gastric Cancer's Low Survival Rate and High Relapse Rate Challenge Physicians

by Dawn Chalaire

The United States has one of the lowest incidences of stomach cancer in the world, but that offers little consolation to the 24,000 Americans diagnosed with the disease each year. Patients with gastric cancer face an uphill battle against a disease that has a five-year survival rate between 5% and 15% and a relapse rate near 80%.

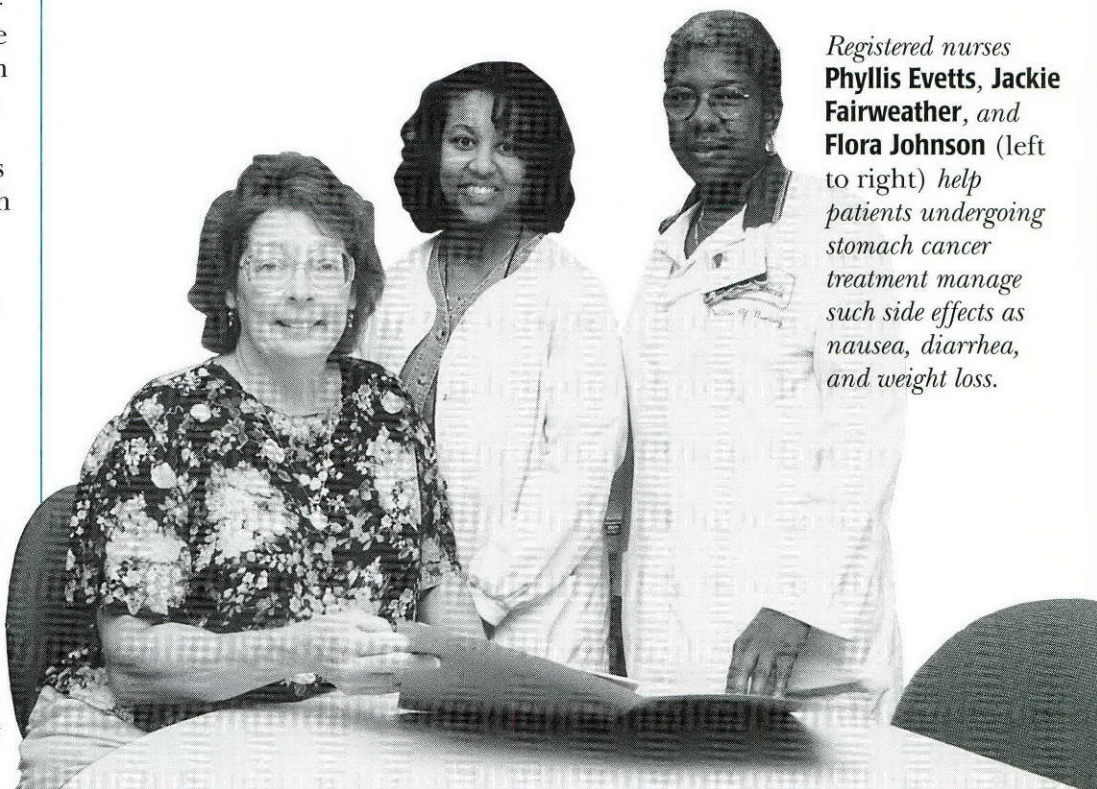
One patient, while waging his own battle against the disease at The University of Texas M. D. Anderson Cancer Center, is also helping others by providing major financial support for a gastric cancer trial at the institution. Carlos Cantu of Mem-

phis, Tennessee, is both patient and benefactor.

Cantu said that he chose M. D. Anderson because he was familiar with its reputation for quality and because his gastroenterologist recommended M. D. Anderson as "user friendly."

Paul Mansfield, M.D., a surgical oncologist at M. D. Anderson, suggested that Cantu would be a good candidate for a trial of preoperative chemotherapy and chemoradiotherapy for potentially resectable adenocarcinoma being led by Jaffer Ajani, M.D., a medical oncologist in the Department of Gastrointestinal Medical Oncology and Digestive Diseases.

"Frankly, I did not know what it entailed, what it meant," Cantu said. "When I met Dr. Ajani, I was very much impressed. I developed an immediate sense of admiration for him for the manner in which he



Registered nurses **Phyllis Evetts, Jackie Fairweather, and Flora Johnson** (left to right) help patients undergoing stomach cancer treatment manage such side effects as nausea, diarrhea, and weight loss.

conducted the interview and explained what would take place.”

While advances such as endoscopic ultrasonography and laparoscopy have made the staging of gastric cancer more accurate and less traumatic for patients, only half of all gastric cancers are identified as local-regional and, therefore, potentially curable. Treatment options for patients with metastatic gastric carcinoma are limited to palliative therapies that focus on prolonging life and improving its quality.

“The patient who has localized cancer, normally you will do all of the studies and if it seems to be confined, surgery will be performed. All known cancer can be removed 40% of the time and cannot all be removed 60% of the time. This is unacceptable; nevertheless, this is the norm,” Dr. Ajani said.

An even more unsettling statistic is that 70% of patients who undergo a successful resection will die within five years. One reason is that many patients have micrometastases at the time of diagnosis that continue to grow following surgery. Randomized studies of the effects of chemotherapy and radiotherapy administered after surgery versus surgery alone have shown little change in outcome.

“So what we have been doing for a long time is treating patients before surgery here. What we are trying to do with this strategy is to treat the micrometastases first. Second, we want to reduce the size of the cancer so that the surgery is more successful,” Dr. Ajani said.

The protocol calls for two courses of chemotherapy over two months with a combination of 5-fluorouracil, cisplatin, and folinic acid, followed by five weeks of low-dose continuous infusion of 5-fluorouracil and radiotherapy (45 Gy) and five weeks of recovery before surgery. The target goal of the protocol is successful resection 70% to 80% of the time. After surgery, follow-up will extend for five years.

In addition to Drs. Ajani and Mansfield, several physicians and departments at M. D. Anderson have been involved in the multi-

Patient Helps Underwrite Familial Cancer Study

It was, in part, the sheer unexpectedness of his gastric cancer diagnosis that prompted patient Carlos Cantu to provide financial support for a study of familial gastric cancer, even though cancer is unknown in his own family.

“I’m a person who never in my life had shown any symptoms. There has been no history of cancer on either side of my family,” Cantu said. “I think that anything that can be done to try to identify those most likely to be susceptible so that they can be prepared is very important.” The University of Texas M. D. Anderson Cancer Center patient is from Memphis, Tennessee.

While the majority of patients diagnosed with stomach cancer are men over age 45, in the past few years Cantu’s oncologist Jaffer Ajani, M.D., has treated an increasing number of young people with the disease. Dr. Ajani, of the Department of Gastrointestinal Medical Oncology and Digestive Diseases, believes the trend suggests a strong genetic predisposition, and he is beginning to develop a database containing a detailed family history of patients suspected of having a gastric cancer family syndrome.

Once the database is established, blood and tissue samples will be collected from the patients and, if possible, all first-degree relatives in order to conduct genetic analyses, which could eventually lead to the discovery of a genetic marker useful for early detection.

Because the incidence of gastric cancer is so low in the United States, Dr. Ajani plans to expand the study into Mexico, Chile, and Japan.

“It’s such an uncommon disease,” he said. “That is why we want to focus on the familial aspects, where the risk is much higher than in the general population.”

Dr. Ajani says he is grateful for contributors like Cantu and his wife, who are supporting ongoing work. Other supporters include the Meyers family of San Antonio, the Ziffer family of Orlando, and the Caporella family of Fort Lauderdale. ●

disciplinary study, including surgical oncologists Dr. Peter Pisters and Dr. Barry Feig, gastroenterologists Dr. Patrick Lynch, Dr. Sandeep Lahoti, and Dr. Isaac Rajjman, and radiation oncologist Dr. Nora Janjan. Jackie Fairweather, a research nurse in the Department of Gastrointestinal Oncology and Digestive Diseases, and nurses Flora Johnson and Phyllis Evetts, help patients manage their side effects, which include nausea, diarrhea, and weight loss.

“All of these people have to work together and just follow on the same path with the patient,” Dr. Ajani said. “The patient is in the middle, and we’re walking around him.”

The next step, Dr. Ajani said, is a multi-institutional trial that will help familiarize other institutions with the protocol. Because there are so many different disciplines involved, coordination and communication are essential to making it a success. Patients must be carefully monitored throughout the therapy, and social support is crucial for helping them get through the many treatments involved.

“This is a unique strategy,” Dr. Ajani said. “Nobody’s yet doing it anywhere else in the world, so we have to have other doctors get familiar with this. There are too many complexities involved. Once people get familiar with it, then we can do the randomized trial.”

The randomized trial will be a comparison of the five-year survival rates of standard therapy (surgery sometimes followed by chemotherapy, radiation therapy, or both) with surgery preceded by chemotherapy and chemoradiotherapy. “We already know the statistics from surgery alone are resulting in a 30% to 35% survival rate, and we are hoping for a 50% survival rate. Unless we do this randomized trial, we will never be able to demonstrate that one approach is better than another,” Dr. Ajani said. ●

FOR MORE INFORMATION, contact Dr. Ajani at (713) 792-2828.

See page 6 for gastric cancer protocols. ▶

Stomach Cancer Protocols Offer Options

Clinical trials currently in progress at The University of Texas M. D. Anderson Cancer Center include the following for patients with gastric cancer.

- A study of CPT-11 in patients with metastatic, unresectable carcinoid tumors or islet cell carcinoma (DM97-246). *Physician: Jaffer A. Ajani, M.D.*
To be eligible for this study, patients must have bidimensionally measurable disease that is at least 2 cm in diameter. Patients with carcinoid tumors must have had no prior chemotherapy, though prior or concurrent somatostatin analogue therapy is allowed. Patients with islet cell tumors may have received one prior regimen. Participants must be ≥ 10 years old with a performance status of 0–2 on the Eastern Cooperative Oncology Group scale and have a life expectancy of at least 12 weeks.
- Phase I study of CPT-11 and concurrent radiation therapy in patients with locally advanced unresectable or metastatic gastric, gastroesophageal junction, or esophageal carcinoma (ID97-311). *Physician: Jaffer A. Ajani, M.D.*
Study participants must be ≥ 18 years old with a performance status of 0–2 on the Zubrod scale. They may have undergone up to two prior regimens of systemic chemotherapy and/or prior radiotherapy to areas other than the primary tumor. Patients who have previously received CPT-11 or topotecan, or who have uncontrolled diabetes mellitus are excluded from the study.
- An open-label, randomized multicenter phase II/III study of docetaxel (RP 56976) in combination with cisplatin or docetaxel in combination with 5-fluorouracil and cisplatin compared with the combination of cisplatin and 5-fluorouracil in patients with metastatic or locally recurrent gastric adenocarcinoma (ID98-167). *Physician: Jaffer A. Ajani, M.D.*

In this study, patients will take docetaxel and cisplatin or docetaxel and 5-fluorouracil. Study participants must have measurable and/or evaluable metastatic disease. Eligibility requirements include a Karnofsky performance status >70 and a life expectancy greater than three months. Patients who have received prior palliative chemotherapy, prior treatment with taxanes, or prior treatment with cisplatin as adjuvant chemotherapy with a cumulative dose >300 mg/m² are ineligible.

- Development of a database with detailed family history in patients suspected of having a gastric cancer family syndrome (DM97-254). *Physician: Jaffer A. Ajani, M.D.*
Patients ≤ 45 years of age must have a clinical history that suggests a family history of gastric carcinoma.
- A trial of preoperative chemotherapy and chemoradiotherapy for potentially resectable adenocarcinoma of the stomach (ID98-224). *Physician: Jaffer A. Ajani, M.D.*
Preoperatively patients will receive 5-fluorouracil, cisplatin, and Taxol in two courses and five weeks of radiotherapy.
- A phase I/II study of paclitaxel, carboplatin, and UFT plus leucovorin in patients with advanced carcinoma of the esophagus, gastroesophageal junction, or stomach (ID96-315). *Physician: Jaffer A. Ajani, M.D.*
Patients must have a Zubrod performance status of ≤ 2 and must not have received any prior chemotherapy or immunotherapy, including adjuvant or neoadjuvant regimens.
- A phase II study of preoperative chemoradiation and intraoperative radiation therapy in the treatment of gastric adenocarcinoma (ID96-043). *Physician: Paul F. Mansfield, M.D.*
Before treatment, patients must undergo endoscopic ultrasonography, a computed tomographic scan of the abdomen, and a staging laparoscopy with peritoneal washings. Kidney function should be normal, and partici-

pants must be able to maintain adequate enteral nutrition (including jejunal feeding, if necessary) before receiving external beam irradiation. Karnofsky performance status must be ≥ 70 .

- A phase I dose escalation trial of hepatic artery infusion with an EF1B-attenuated adenovirus, ONYX-015, alone and in combination with intravenous 5-fluorouracil/leucovorin into patients with intrahepatic metastases from gastrointestinal carcinoma (ID98-184). *Physician: James L. Abbruzzese, M.D.*
Study participants must have a histologically or cytologically confirmed carcinoma of colorectal, gastric, or pancreatic origin that has metastasized to the liver. The liver tumor must be unresectable and amenable to perfusion through a hepatic artery catheter. Patients are ineligible if prior to beginning the study they had a viral syndrome diagnosed within two weeks, chemotherapy within three weeks, or radiotherapy to the target tumor site within four weeks.
- Phase I study of intraperitoneal recombinant human interleukin-12 in patients with peritoneal carcinomatosis associated with müllerian and gastrointestinal carcinomas (ID97-027). *Physician: Renato Lenzi, M.D.*
To enroll, patients must have pathologic or cytologic diagnosis of müllerian carcinoma (epithelial ovarian or peritoneal carcinoma) or gastrointestinal cancer with abdominal carcinomatosis. Patients must have had no chemotherapy for ≥ 3 weeks (≥ 6 weeks for mitomycin C) and no radiation therapy for ≥ 3 months prior to the start of treatment. Patients must also have a Zubrod performance status of 0–2. ●

FOR MORE INFORMATION about these clinical trials, physicians or patients may call the M. D. Anderson Information Line. Those within the United States, call (800) 392-1611; those in Houston or outside the United States, call (713) 792-6161. Visit the M. D. Anderson Cancer Center clinical trials Web site at <http://www.clinicaltrials.org> for a broader listing of treatment research protocols.



Environmental Carcinogens: Fact and Fiction

From nuclear radiation to artificial sweeteners, environmental carcinogens are among the most publicized—and most misunderstood—causes of cancer.

Between 65% and 85% of all cancer deaths in the United States are linked to environmental (noninherited) causes. Of those, the majority (up to 60% of all cancer deaths) are blamed on voluntary lifestyle choices.

Below are some substances suspected of being environmental carcinogens—materials that cause cancer—and their associated risks.

Radiation. Many types of radiation have been linked to cancer.

- An estimated 2% of all cancer deaths are blamed on exposure to radiation. Most result from melanoma, skin cancer caused by the sun's ultraviolet (UV) rays, exposure that increases with ozone layer disruption.
- While the radiation emitted from nuclear substances (ionizing radiation) is undoubtedly carcinogenic, the likelihood of overexposure is low. The National Cancer Institute found no evidence of increased risk of death from cancer for those who live near nuclear energy facilities.
- Radon gas, which is emitted from the earth, has been linked to an increase in lung cancer among miners working underground for prolonged periods. It may seep into the basement or first floor of a building, where it can increase lung cancer risk, especially in active smokers.
- Some studies appeared to show a possible link between electromag-

netic fields and childhood leukemia and other cancers, but the findings have not been reproduced.

- Despite widespread publicity about the possible link between brain cancer and radiation produced by cellular telephones, studies conducted so far have failed to establish a connection.

Artificial sweeteners. The U.S. Food and Drug Administration proposed a ban on saccharin in 1977 because studies linked it to bladder cancer in animals. The ban was never enacted, but products containing saccharin must carry a warning label. A study conducted by the National Cancer Institute in 1978 failed to show a greater risk of bladder cancer in people who used saccharin;

however, there was some evidence of an increased risk among heavy users.

A report released in 1996 suggested that aspartame (NutraSweet, Equal) was linked to an increase in the number of persons in the U.S. with brain tumors between 1975

and 1992, but a subsequent analysis by the National Cancer Institute does not support the association.

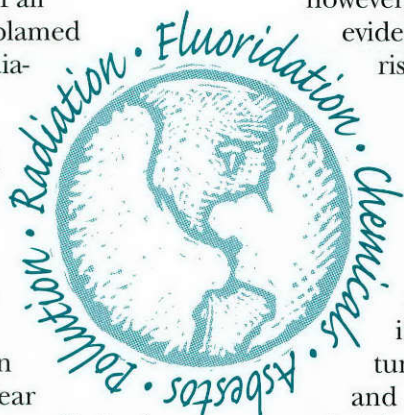
Fluoridated water. The controversy over fluoridated water stems from a 1990 study in which a small percentage of male rats developed bone cancer after drinking water containing fluoride in amounts up to 100 times greater than the levels found in drinking water. More recent studies have found no evidence of an increased cancer risk associated with fluoridated drinking water.

Chemicals. Various chemicals are known to cause cancer, for example,

benzene, formaldehyde, vinyl chloride, and arsenic.

Asbestos. Asbestos, a mineral fiber used in construction, has long been associated with very high risk for lung cancer, especially in smokers. After being declared a carcinogen by the Environmental Protection Agency, asbestos was banned from use in the United States and heavy exposure to the substance virtually ended. Most experts agree that asbestos in existing structures does not pose a threat to health unless it is disturbed and enters the air, from which it can be inhaled.

Pollution. The effect on cancer rates of environmental pollutants in the air, water, and soil is extremely difficult to determine. A conservative estimate attributes 2% of fatal cancers to exposure to pollutants. Long-term exposure to air pollution, especially diesel exhaust, has been shown to increase the risk of lung cancer in smokers. Certain pesticides, including DDT, are suspected of increasing the risk of breast cancer, but the claim is unproved. A recent study conducted by the National Cancer Institute suggests the contamination of drinking water with nitrate, a chemical found in fertilizers, may be associated with an increased risk of non-Hodgkin's lymphoma. ●



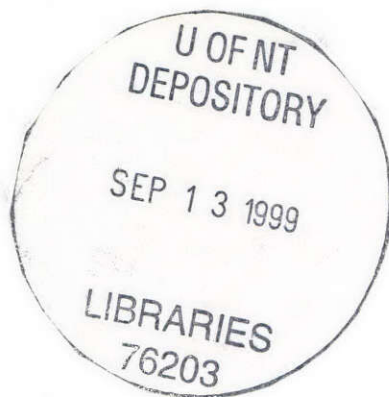
For more information, contact your physician or contact the M. D. Anderson Information Line:

 (800) 392-1611 within the United States, or

 (713) 792-6161 outside the United States.

April 1999

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Staff Publications in April

Below is a partial list of staff publications appearing this month.

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