Would you like fries with that?

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Exploiting interactions between food and drugs could dramatically lower the rapidly rising costs of several anticancer drugs, and perhaps many other medications, two cancer-pharmacology specialists suggest in a commentary in the July 16, 2007, issue of the *Journal of Clinical Oncology*.

University of Chicago oncologists Mark Ratain, MD, and Ezra Cohen, MD, call attention to the flip side of recent studies showing how certain foods can alter absorption or delay breakdown of precisely targeted anti-cancer drugs.

Instead of seeing such studies as highlighting a dosing problem, Ratain and Cohen argue that results like this one should point researchers toward a partial solution, a novel way to decrease medication costs while increasing benefits from these effective but expensive drugs.

The commentary was inspired by a study presented in June at the American Society for Clinical Oncology. Researchers from Dartmouth showed that taking the breast cancer drug lapatinib (TYKERB) with food—instead of on an empty stomach as suggested on the label—resulted in more of the drug being absorbed and available to treat the cancer.

Patients currently take five 250 mg lapatinib tablets on an empty stomach. The study found that taking the drug with a meal increased the bioavailability of the drug by 167 percent. Taking the drug with a high-fat meal boosted levels by 325 percent.

"Simply by changing the timing, taking this medication with a meal instead of on an empty stomach, we could potentially use 40 percent (or even less) of the drug," said Ratain. "Since lapatinib costs about $2,900 a month, this could save each patient $1,740 or more a month."

Topping off that meal with grapefruit juice, "which may also increase plasma concentrations" according to the package insert, could increase the savings to 80 percent, the authors suggest, "minus the cost of the food and juice."

"We expect the one 250 mg lapatinib pill accompanied by food and washed down with a glass of grapefruit juice may yield plasma concentrations comparable to five 250 mg pills on an empty stomach," Ratain said.

Such a "value meal," the authors add, may have other benefits. The major toxicity associated with lapatinib is diarrhea, probably caused by unabsorbed drug. So taking a lower dose with food should "reduce the amount of unabsorbed drug, and therefore theoretically also reduce the frequency and severity of diarrhea."

Patients should NEVER launch such experiments on their own, the authors caution. Such food-drug combinations should be studied to assess the effects, note person-to-person variations, and enable physicians to predict how individual patients will take up and metabolize specific drugs in the presence of certain foods.

"The one thing that should not be anticipated is an efficacy study by lapatinib's sponsor," the authors write. Such studies could be mounted by other entities, however, such as the Federal government, other payers or advocacy groups.

Ratain and Cohen are currently conducting such a study, a phase I trial

of the combination of oral sirolimus (rapamycin) taken with grapefruit juice, which contains substances that delay the breakdown of many drugs.

Dozens, perhaps hundreds, of drugs ought to be studied in this way, the authors said. "If we understood the relationship between, say, grapefruit juice and common drugs, such as the statins, which taken daily by millions of people to prevent heart disease, we could save a fortune in drug costs," Cohen said. "And patients would get a little vitamin C to boot."

"The rapidly escalating price of medications (especially for cancer and other life-threatening diseases) has provided incentives to explore pharmacological approaches to lower the costs of drugs," Ratain and Cohen conclude.

"As we enter an era of 'targeted' anticancer agents with a monthly cost measured in thousands of dollars, we should view drug-drug or drug-food interactions as opportunities to lower costs."

Source: University of Chicago Medical Center

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