Grapefruit juice can give cancer drugs dramatic boost

- **Grapefruit stops an enzyme from breaking drug down so more enters the bloodstream**
- **Study is first to harness this usually dangerous drug interaction with grapefruit**
- **Could reduce side-effects as less medication needed**

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Drinking a glass of grapefruit juice a day could dramatically increase the effectiveness of cancer drugs, according to a study.
Patients who combined the fruit with a specific anti-cancer drug received the same benefits as they would have from taking more than three times of the medication by itself.
Researchers from the University of Chicago Medicine said the combination could help patients avoid side effects associated with high doses of the drug and reduce the cost of the medication.

Grapefruit affects the enzymes in the intestine, preventing them from breaking down certain medications
Grapefruit juice is known to prevent enzymes in the intestine that break down certain drugs, meaning more can enter the blood stream. This means doctors often tell patients to avoid the fruit when taking particular medications as it can cause serious side-effects or overdose.
Scientists now wanted to see if they could harness this effect. Study leader Dr Ezra Cohen said: 'Grapefruit juice, and drugs with a similar mechanism, can significantly increase blood levels of many drugs.
'But this has long been considered an overdose hazard. Instead, we wanted to see if grapefruit juice can be used in a controlled fashion to increase the availability and efficacy of sirolimus.'
Sirolimus or rapamycin is used to prevent rejection in organ transplantation but is also being tested as a treatment for certain tumours.
In a study published in Clinical Cancer Research, the Chicago team showed that patients who drank eight ounces of grapefruit a day increased their sirolimus levels by 350 per cent.

WHEN TO AVOID GRAPEFRUIT: DRUG INTERACTIONS

Certain substances in grapefruit juice are known to stop an enzyme in the small intestine from breaking down some medications. This allows more of the drug to enter the blood stream and could cause serious side-effects or accidental overdose.
Seville oranges affect the same enzyme.
While most drugs to not interact there are around 50 that do.

The affected drugs include some used to treat high cholesterol such as statins, some medications for high blood pressure, depression, pain, erectile dysfunction, HIV and allergies.
Always check the medication bottle for potential interactions and check with your GP or pharmacist if you are uncertain.
For more information visit
http://www.nhs.uk

A drug called ketoconazole that also slows drug metabolism increased sirolimus levels by 500 percent.
The effect of grapefruit on the enzymes in the intestine begins within a few hours of consumption and gradually wears off over a few days.
Dr Cohen and colleagues organized three simultaneous phase-1 trials of sirolimus. Patients received only sirolimus, sirolimus plus ketoconazole, or sirolimus plus grapefruit juice. They enrolled 138 patients with incurable cancer and no known effective therapy.
The first patients started with very low sirolimus doses, but the amounts increased as the study went on, to see how much of the drug was required in each setting to reach targeted levels, so that patients got the greatest anti-cancer effect with the least side effects.
The optimal cancer-fighting dose for those taking sirolimus was about 90 mg per week. At doses above 45 mg, however, the drug caused serious gastrointestinal problems, such as nausea and diarrhea, so patients taking sirolimus alone switched to 45 mg twice a week.
The optimal doses for the other two groups were much lower. Patients taking sirolimus plus ketoconazole, needed only 16 mg per week to maintain the same levels of drug in the blood. Those taking sirolimus plus grapefruit juice, needed between 25 and 35 mg of sirolimus per week.
No patients in the study had a complete response, but about 30 percent of patients in the three trials had stable disease, meaning a period when their cancers did not advance.
One patient receiving grapefruit juice had a partial response - significant tumor shrinkage - that lasted for more than three years.
'This is the first cancer study to harness this drug-food interaction,' the authors noted.