which is not converted to PGE_1, relaxes preparations of coronary arteries. Indomethacin added with the arachidonic acid not only blocked the relaxing effect but also caused the arteries to contract. Needleman says that this result suggests that arachidonic acid was not active itself but had to be continuously converted to an unstable prostaglandin that causes the relaxation.

Although the investigators subsequently showed that the endoperoxide PGH_2 relaxes coronary artery muscle, they have evidence that the endoperoxide is converted to another labile compound that is much more potent. This material has all the characteristics of PGI_2. For example, Needleman and his colleagues find that bovine coronary arteries incubated with labeled arachidonic acid convert it to 6-keto-prostaglandin $F_{1\alpha}$, the stable breakdown product of PGI_2.

Needleman says that the coronary blood vessels produce PGI_2 when the heart is stimulated by the hormone bradykinin or when it is made oxygen-deficient by temporarily obstructing the coronary arteries. He thinks that by promoting dilation of the coronary arteries and increasing blood flow, the compound may help to protect the heart muscle when the demand for oxygen is great, as in times of stress, or when blood flow to the organ is restricted.

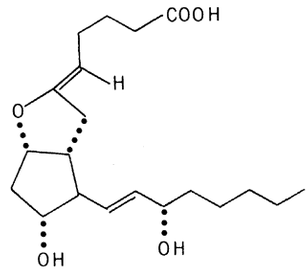

Fig. 2. The structure of PGI_2 or prostacyclin.

Although most investigations of PGI_2 activity have been carried out in vitro, investigators are beginning to look at the effects of the agent in intact animals. For example, Peter Ramwell and his colleagues at Georgetown University Medical School and the Naval Medical Research Institute have found that PGI_2 injections into dogs and rhesus monkeys markedly reduce blood pressure. They think that the agent works by relaxing the smooth muscle of blood vessel walls. In monkeys it decreases the resistance to blood flow of the systemic circulatory system, an effect usually attributed to dilation of the small arteries.

The discovery of the role of TXA_2 and PGI_2 in blood clotting may make it possible to design more effective strategies for preventing heart attacks. Investigators do not expect that PGI_2 itself will be very useful in this regard because it is unstable, although it might be of some benefit if given by continuous intravenous injection to hospitalized patients. The agent reverses aggregation of platelets as well as preventing it and could help to dissolve clots that have already formed. But clinicians would no doubt prefer longer-acting agents. Chemists are already trying to synthesize stable analogs of PGI_2; another approach to preventing blood clotting would be to develop specific inhibitors of the enzyme that synthesizes TXA_2.

E. J. Corey and his colleagues at Harvard University have synthesized PGI_2 and four analogs that have been tested in in vitro systems by Ramwell. All the analogs inhibit the aggregation of human platelets induced by incubating them with adenosine diphosphate, but none are as potent as some of the natural prostaglandins. For example, PGE_1 is 20 times more effective in preventing platelet aggregation than the most active analog.

Although the effects of these analogs are not impressive, cardiovascular disease is such an important health problem that it is a sure bet that a large number of PGI_2 analogs will be synthesized and

Speaking of Science

Drinkers Rejoice: A Little Wine May Kill Your Virus

Wine lovers can take heart from new Canadian results about the value of wine to your health. Wine connoisseurs already know that a U.S. government report has said that a goblet a day is a good tonic for lassitude, sleeplessness, old age, and other infirmities. Now, Jack Konowalchuk and Joan I. Speirs of Health and Welfare Canada have shown that wine is an effective antiviral agent.

The disinfectant properties of wine have long been recognized. Ancient Egyptian warriors invading less civilized countries mixed wine with the local water in an effort to avoid contracting what was then probably termed the Assyrian Two-Step. Up until the 19th century, it was frequently recommended that wine be used to detoxify impure water that could cause cholera. And more recently, several investigators have shown that wine is an antibacterial agent. But Konowalchuk and Speirs believe they are the first to demonstrate that it possesses antiviral properties.

Konowalchuk and Speirs are food virologists in their agency's Bureau of Microbial Hazards. Their primary responsibility is to check shellfish, vegetables, fruits, and so forth to find potential hazards from contamination. In the course of their work, they observed that some fruits, such as strawberries, raspberries, and grapes possess antiviral activity. Investigating further, they found that this activity apparently results from the presence of tannins and other naturally polymerized phenols, the same substances that endow the fruits with antibacterial activity. Since these compounds are present in grapes, they decided to check wine.

They found that poliovirus, herpes simplex virus, and various enteric viruses (which cause gastrointestinal distress) are inactivated by incubation with wine or diluted wine. Red wine is much more effective than white wine, presumably because grape skins, which contain most of the phenols, are used in fermentation of red wines but not for the whites. Plain grape juice is even more active. This last fact may be distressing to oenophiles, but it is not surprising. Various scientists have estimated the phenolic content of white wines to be about 260 mg/liter, whereas that of red wines is about 2200 mg/liter and that of Concord grape juice is 3300 mg/liter.

The two investigators do not claim to have discovered disease-curing properties for wine or grape juice. All of their experiments were conducted in the test tube and under the microscope and not with human subjects. But their findings do indicate that the fruit of the vine can inactivate viruses with which it comes in contact, suggesting that it might be of some benefit against the little beasties that wreak havoc in the stomach and intestines. Four ounces of prevention may well be better than a pound of cure.—T.J.M.