countries and by approximately 8% in low- and middle-income countries, and the money generated from taxes could be used to implement and enforce tobacco control efforts. But governments around the world currently collect 500 times more money in tobacco taxes each year than they spend on antitobacco efforts.

The WHO report outlines a strategy to reduce tobacco use across the globe, a program called MPOWER (http://www.who.int/tobacco/mpower/facts_findings/en/index.html). “While efforts to combat tobacco are gaining momentum, virtually every country needs to do more. These six strategies are within the reach of every country, rich or poor and, when combined as a package, they offer us the best chance of reversing this growing epidemic,” said Margaret Chan, MD, the WHO’s director-general, in a statement at the time of the report’s release.

According to McKay, wide dissemination of the report is needed so that it gets into the hands of policy makers and policy influencers in as many countries as possible. Advocates of tobacco control efforts are urging unanimous ratification of the Framework Convention on Tobacco Control, a tobacco control treaty adopted by member countries of the WHO (http://www.who.int/tobacco/framework/en/). In addition, “governments should act now, especially on taxation,” said McKay. “Of all the recommended policies in the MPOWER package, taxation is the most effective.”

WHO is scaling up its ability to help nations put the MPOWER strategies in place. Through the Bloomberg Initiative—a $1.25 billion global tobacco control effort by New York City’s Mayor Michael Bloomberg—the WHO, the Campaign for Tobacco Free Kids, the Centers for Disease Control and Prevention, the Johns Hopkins Bloomberg School of Public Health, and the World Lung Foundation are working together to coordinate tobacco control activities and provide grants to country-level organizations to combat the tobacco epidemic. □

Grapefruit Compound Battles Hepatitis C

Tracy Hampton, PhD

A compound that naturally occurs in grapefruit and certain other citrus fruits may be capable of fighting chronic hepatitis C infection by blocking an important pathway in the virus’ lifecycle. New studies conducted in human liver cells show that the common flavonoid naringenin inhibits the secretion of hepatitis C virus from infected cells, a process required to maintain chronic infection (Nahmias Y et al. Hepatology. doi:10.1002/hep.22197 [published online ahead of print January 7, 2008]).

Before they began their investigation of naringenin’s effects on hepatitis C, researchers at the Massachusetts General Hospital Center for Engineering in Medicine in Boston first noted that hepatitis C virus is bound to very low-density lipoprotein (VLDL) when it is released from cells. “By finding that hepatitis C virus is secreted from infected cells by latching onto VLDL, we have identified a key pathway in the viral lifecycle,” said lead author Yaakov Nahmias, PhD, a research fellow at Harvard Medical School.

Grapefruit’s bitter taste is caused by the presence of naringin, which is metabolized into naringenin. Researchers previously demonstrated that naringenin can help lower cholesterol levels in animals and in human cells (Kurowska E et al. Nutr Res. 2000; 20[1]:121-129; Allister EM et al. Diabetes. 2005;54[6]:1676-1683). Also, a recent clinical trial in hypercholesterolemic patients revealed that a low dose of naringin lowered LDL levels by 17% (Jung UJ et al. Clin Nutr. 2003;22[6]:561-568). Because other studies have shown that naringenin can reduce secretion of VLDL from liver cells, Nahmias and colleagues decided to examine whether the compound might also lower hepatitis C virus secretion from infected cells.

When the scientists silenced lipoprotein mRNA in infected human liver cells, they noted a 70% reduction in the secretion of hepatitis C virus. Also, nontoxic amounts of naringenin reduced hepatitis C virus secretion in infected cells by 80%. In mouse studies, injections of naringenin effectively reduced circulating VLDL levels in the animals’ plasma without toxicity.

The researchers suggest that if the findings in these studies extend to the clinic, naringenin might be prescribed to help patients clear hepatitis C virus. Because this viral infection appears to rely on cholesterol metabolism, atherosclerosis therapies may be effective at hepatitis C virus suppression as well.

“These results suggest that lipid-lowering drugs, as well as supplements such as naringenin, may be combined with traditional antiviral therapies to reduce or even eliminate hepatitis C virus from infected patients,” said Nahmias. Future studies will assess naringenin’s and other citrus flavonoids’ potential for reducing levels of the virus in infected animals. □