



Rosy periwinkle

## 1 IN 3 AMERICANS STRUGGLES WITH A CHRONIC DISEASE THAT MAY BE TREATED WITH PHARMACEUTICALS DERIVED FROM NATURAL COMPOUNDS.

Hundreds of the pharmaceuticals used to treat chronic diseases such as cancer, hypertension, high cholesterol, diabetes, HIV, and other serious conditions are developed from plants and animals in threatened natural habitats:

- **BREAST, LUNG, OVARIAN, COLON, AND RECTAL CANCERS AFFECT MORE THAN 4 MILLION AMERICANS.**<sup>1</sup> These cancers are regularly treated with drugs created from an Asian tree (*Camptotheca acuminata*) and the Pacific yew tree.<sup>2</sup>
- **LEUKEMIA AND LYMPHOMAS AFFECT MORE THAN 600,000 PEOPLE**<sup>3</sup> in the United States. These diseases can be treated with drugs derived from the rosy periwinkle, a flowering plant native to Madagascar.<sup>4</sup>
- **56 MILLION AMERICANS SUFFER FROM CARDIOVASCULAR DISEASE.**<sup>5</sup> Drugs originally derived from Brazilian pit viper venom are often used to treat high blood pressure and congestive heart failure.<sup>6</sup>
- **27 MILLION AMERICANS SUFFER FROM HIGH CHOLESTEROL,**<sup>7</sup> and many rely on cholesterol-lowering drugs. The discovery of cholesterol-lowering compounds in a fungus in China has led to the development of a whole class of drug treatments for high cholesterol.<sup>8</sup>
- **TYPE 2 DIABETES AFFECTS MORE THAN 21 MILLION AMERICANS.**<sup>9</sup> A drug used to treat this condition is based on peptides originally found in the saliva of the Gila monster,<sup>10</sup> a rare lizard found in northern Mexico and the southwestern U.S.
- **MORE THAN ONE MILLION AMERICANS ARE HIV POSITIVE.**<sup>11</sup> An antiretroviral medication derived from a marine sponge is part of the standard treatment.<sup>12</sup>



Gila monster





Marine sponges and coral

Half of all drugs developed in the past 25 years have an active ingredient derived from natural areas.<sup>13</sup> However, more than 80,000 acres of rain forest are destroyed every day, and 30 percent of the world's coral reefs are already lost. Scientists predict habitat destruction and current extinction rates will result in the loss of one major new drug every two years.<sup>14</sup>

## 106,746,040 AMERICANS HAVE A CHRONIC DISEASES THAT MAY BE TREATED WITH DRUGS DERIVED FROM NATURAL SOURCES

### CANCER<sup>15</sup>

Breast cancer	2,546,221
Colon and rectal cancer	1,103,930
Non-Hodgkin's lymphoma	413,427
Lung and bronchial cancer	364,874
Leukemia	199,294
Ovarian cancer	175,072
Hodgkin's lymphoma	156,242
Acute lymphocytic lymphoma	16,980
<b>Total cancer</b>	<b>4,976,040</b>

### HIV<sup>16</sup> 725,000

(One million Americans are HIV-positive.)

### CARDIOVASCULAR DISEASE<sup>17</sup>

High blood pressure	54,012,500
High cholesterol	25,882,500
<b>Total cardiovascular disease</b>	<b>79,895,000</b>

### TYPE 2 DIABETES<sup>18</sup> 21,150,000

(90% of diagnosed U.S. diabetes cases are Type 2)

**Total cancer, HIV, cardiovascular disease, and Type 2 Diabetes:\* 106,746,040**

\*Conservative estimate based on disease prevalence only for American adults ages 20 and older.<sup>19</sup>



Brazilian pit viper

<sup>1</sup> National Cancer Institute, SEER Cancer Statistics Review 1975-2006.

<sup>2</sup> Eric Chivian and Aaron Bernstein 2008. Threatened groups of organisms valuable to medicine. In *Sustaining life: How human health depends on biodiversity*, Eric Chivian and Aaron Bernstein, eds. Oxford University Press, New York, pp. 255-256.

<sup>3</sup> National Cancer Institute.

<sup>4</sup> Chivian and Bernstein.

<sup>5</sup> American Heart Association, 2010. Heart disease and stroke statistics, 2010 update at-a-glance.

<sup>6</sup> Mark S. Butler 2005, Natural products to drugs: natural product derived compounds in clinical trials, *Natural Products Report*, 22:162-195.

<sup>7</sup> American Heart Association.

<sup>8</sup> Akira Endo 2004. The origin of the statins, *Atherosclerosis Supplements 5*, pp. 125-130.

<sup>9</sup> National Diabetes Information Clearinghouse, *National Diabetes Statistics 2007*, National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health.

<sup>10</sup> Chin, Y-W, M.J. Balunas, H.B. Chai, and A. D. Kinghorn. 2006. Drug Discovery from Natural Sources, *AAPS Journal*, 8(2) pp. 239-253.

<sup>11</sup> Centers for Disease Control and Prevention. HIV Prevalence Estimates—United States, 2006. *Morbidity and Mortality Weekly Report* 2008; 57(39):1073-1076.

<sup>12</sup> AIDSinfo, U.S. Department of Health and Human Services, [http://www.aidsinfo.nih.gov/DrugsNew/DrugDetailNT.aspx?int\\_id=4](http://www.aidsinfo.nih.gov/DrugsNew/DrugDetailNT.aspx?int_id=4).

<sup>13</sup> Chin, Y-W, M.J. Balunas, H.B. Chai, and A. D. Kinghorn.

<sup>14</sup> Brian Groombridge and Martin D. Jenkins, *World Atlas of Biodiversity: Earth's Living Resources for the 21st Century*, U.N. Environment Programme World Conservation Monitoring Centre, University of California Press, 2002.

<sup>15</sup> National Cancer Institute.

<sup>16</sup> Centers for Disease Control and Prevention.

<sup>17</sup> Heart disease and stroke statistics, 2010 update at-a-glance.

<sup>18</sup> National Diabetes Information Clearinghouse.

<sup>19</sup> U.S. Census Bureau, *2006-2008 American Community Survey*.