

mg, with 1000 mg or more capable of inducing headache, nausea, insomnia, restlessness, excitement, mild delirium, muscle tremor, tachycardia, and extrasystoles. Leung also adds "caffeine has been reported to have many other activities including mutagenic, teratogenic, and carcinogenic activities; . . . to cause temporary increase in intraocular pressure, to have calming effects on hyperkinetic children . . . to cause chronic recurring headache . . . Coffee drinking has also been linked to myocardial infarction . . . cancer of the lower urinary tract (e.g., bladder), ovaries, prostate, and others."

Most of these reports have been challenged.<sup>29</sup> Jacobson cites numerous studies on pregnant animals and humans in which the equivalent of three to four daily cups of coffee caused birth defects such as cleft palate and missing bones.<sup>138</sup> Colonic irrigation with coffee can be quite hazardous. In some individuals, caffeine causes nervousness, restlessness, excitement, and insomnia. Patients with peptic ulcers, hypertension, and other cardiovascular and nervous disorders are usually advised by their physicians to refrain from drinking coffee. After noting that her husband had indigestion for 2 years, until he stopped his 8-cup-a-day habit, Rose quotes, "Coffee squeezes the adrenals dry and the next day when you need the energy of the adrenals they have nothing to give — resistance lowers and illness strikes with difficulties like circles under the eyes."<sup>149</sup> *Science News*<sup>139</sup> reports evidence that caffeine acts as a chemical "antagonist" blocking the normal action of adenosine, resulting in a hyperactive adenosine system, which causes abnormal sedation (and a craving for caffeine), whenever the effects wear off. Other scientists report an, as yet, unidentified compound in both regular and decaffeinated coffee (but not in tea or cocoa) that inhibits the binding of the opiate antagonist naloxone to opiate binding sites in the brain. The substance may also act as an opiate antagonist, blocking the opiates which work as both painkillers and mood elevators.<sup>139</sup> Chlorogenic acid may induce rhinitis and dermatitis in workers engaged in roasting, sorting, or grinding coffee.<sup>17</sup> The role of chlorogenic acid in the respiratory symptoms was discounted.<sup>6</sup> Still, workers develop asthma, dermatitis, rhinitis, and urticaria.<sup>6</sup> Inhalation of coffee bean dust can produce coffee worker's lung, a type of allergic alveolitis. Lest this review seems to bias against my caffeine-containing friends: cocoa, cola, and coffee, I should cite Ponte's recent paper "All About Caffeine".<sup>140</sup> He first discusses the evidence that caffeine is addictive, that more than 2 1/2 cups of daily coffee can cause nervousness, anxiety, and shortness of breath; that more than 10 cups can cause ringing in the ears, mild delirium, flashes of light, rapid irregular heartbeat, rapid breathing, muscle tension, and trembling; that under extreme conditions caffeine may poison pregnant rats and induce birth defects; that caffeine does affect the heart; that it may be linked to cancer of the pancreas. Ponte then notes the conclusion of one of the world caffeine experts, B. A. Kihlman, University of Upsala, Sweden: "When all the evidence is weighed," he has written, "only pregnant women, and those with some special health problems such as arrhythmia, seem even remotely at risk from heavy consumption of regular coffee."<sup>140</sup> Coffee extracts are GRAS (§ 182.20), but the GRAS status of caffeine (§ 182.1180) is being reassessed.<sup>29</sup>