Arsenic belongs to that column in the periodic table of chemical elements known as the “Group V elements”, also including phosphorus, antimony and bismuth. See Chart 5.

Following the success of Salvarsan as a treatment for syphilis, other compounds of antimony and bismuth were also prepared and tried against spirochetes. Examples of these compounds include bismuth subcitrate, bismuth subsalicylate (Pepto-Bismol), bismuth subgallate and many others. An example of an antimony-containing antibiotic is Pentostam (an antimonial, antimony sodium gluconate). (27, 28)

A biological molecule known as ATP (adenosine triphosphate) supplies energy to biological systems and does so through the high energy bonds found in a chain of three terminal phosphate groups. One of the mechanisms by which arsenic exerts its toxic effect is the substitution of phosphorus by arsenic in ATP, since both arsenic and phosphorus lie in the same column of the periodic table of chemical elements and have similar chemistry. See Chart 6.

When this substitution occurs, the molecule experiences immediate hydrolysis, breaks down and is no longer functional as a source of energy for the cell. Both antimony and bismuth are also found in this column of the periodic table (Group V). (29, 30) See Chart 7.