Cyclooxygenase-2: From Arthritis Treatment to New Indications for the Prevention and Treatment of Cancer

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Arthritic conditions most likely have existed as long as human beings have walked the earth, but the first recorded history of treating inflammatory rheumatic diseases was discovered on ancient stone tablets from the Sumerian period. The tablets describe the use of willow leaves to treat these painful conditions. The Egyptians also understood the analgesic properties of the willow leaves and the decoction of myrtle for the relief of joint and uterine pains (Jack, 1997; Pepper, 2000). The history of humankind’s endeavors to treat painful joint and musculoskeletal conditions has progressed from the 18th through the 21st centuries with the development of acetylsalicylic acid (i.e., aspirin), corticosteroids, and nonsteroidal anti-inflammatory drugs (NSAIDs), ultimately leading to the discovery of a new class of agents known as the cyclooxygenase- (COX-) 2 inhibitors.

The discovery of the isoenzymes cyclooxygenase-(COX-) 1 and COX-2 led to the development of newer nonsteroidal anti-inflammatory drugs (NSAIDs) designed to block COX-2, such as rofecoxib, celecoxib, and valdecoxib. Because of the specificity of COX-2 expression, COX-2 inhibitors have the potential to reduce the risk of gastrointestinal bleeding experienced with the use of classic NSAIDs. With their crucial role in the control of inflammation, the COX-2 agents originally were marketed for the treatment of rheumatoid and osteoarthritis. However, promising new indications for COX-2 agents in the prevention and treatment of cancer are under investigation. The role of aberrant COX-2 expression in the development of cancer has been studied most widely in patients with colon cancer and adenomas. Recent studies suggest that COX-2-derived prostaglandins may play an important role in tumor viability, growth, and control of metastasis. Possible new indications for the use of COX-2 inhibitors to prevent and treat cancers may be monumental. However, therapy with these agents is not without risk. Oncology nurses must be aware of the potential problems inherent in the use of COX-2 as well as COX-2 agents for chemoprevention in certain cancers.

Key Words: chemoprevention; cyclooxygenase inhibitors; anti-inflammatory agents, non-steroidal

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