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LETTERS TO THE EDITOR

Mechanisms behind the aspirin use and decreased breast cancer incidence

Dear Editor,

Aspirin, also known as acetylsalicylic acid, is used widely as an analgesic to relieve pain, as an antipyretic to reduce fever, and as an anti-inflammatory medication. Aspirin and other nonsteroidal antiinflammatory drugs (NSAIDs) inhibit the production of prostaglandins and cyclooxygenases (COX-1 and COX-2). Although the benefit of aspirin for ischemic heart disease is well-known, an increasing amount of information about the role of aspirin in decreasing the incidence of cancer is emerging. Some epidemiological studies showed that aspirin and other NSAIDs are inversely related to the incidence of various cancers [1]. Among several malignancies, breast cancer is one of the cancers which may be influenced from aspirin intake.

A recent prospective cohort study by Bardia and coworkers [2] demonstrated that aspirin, but not other NSAIDs use, was associated with about 20% lower risk of postmenopausal breast cancer development and did not vary by ER or PR status of the tumor, suggesting that the hypothesized protective effects of aspirin may either be through cellular pathways independent of estrogen or progesterone signaling, or be due to tumor microenvironment. We would like to comment on the possible pathways explaining the anti-breast cancer effect of aspirin independent of ER and PR status.

There is increasing evidence in the literature that aspirin has anticancer effects in breast cancer. Its anticancer activities seem to be via several molecular mechanisms. One obvious molecular target for aspirin is COX-2, since this enzyme is strongly and rapidly induced in response to mediators of inflammation, growth factors, cytokines, and endotoxins, and is involved in cell proliferation and tumor promotion [1]. The proapoptotic effect of aspirin cannot be explained by inhibition of prostaglandin synthesis alone. It also induces apoptosis by regulation of some genetic targets such as ALOX15 [3], the proapoptotic gene PAWR [4], and the antiapoptotic gene BCL2L1; and through activating the signaling pathways [5], such as P38 MAPK and ceremide pathways and release of mitochondrial cytochrome C. Taking these molecular and genetic mechanisms of aspirin into consideration, aspirin use is associated with decreased breast cancer incidence independent of hormonal status of the tumor.

References

1. Vainio H, Morgan G, Kleihues P. An international evaluation of the cancer-preventive potential of nonsteroidal anti-inflammatory drugs. Cancer Epidemiol Biomarkers Prev 1997; 6: 749-753.
2. Bardia A, Olson JE, Vachon CM et al. Effect of aspirin and other NSAIDs on postmenopausal breast cancer incidence by hormone receptor status: results from a prospective cohort study. Breast Cancer Res Treat. 2010 Jul 29. [Epub ahead of print]
3. Shureiqi I, Xu X, Chen D et al. Nonsteroidal anti-inflammatory drugs induce apoptosis in esophageal cancer cells by restoring 15-lipoxygenase-1 expression. Cancer Res 2001; 61: 4879-4884.
4. Zhang Z, DuBois RN. Par-4, a proapoptotic gene, is regulated by NSAIDs in human colon carcinoma cells. Gastroenterology 2000; 118: 1012-1017.
5. Elwood PC, Gallagher AM, Duthie GG et al. Aspirin, salicylates, and cancer. Lancet 2010; 373: 1301-1309.

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