Colon rectal cancer is one of the most common types of cancer and it is the third leading cause of cancer related death among western countries. Unlike other diseases like cardiovascular or infectious illness whose prevention contributes to a high percent reduction on morbidity and mortality; the gain in cancer prevention is limited. Current chemotherapy treatments are highly toxic and with a low percentage of tumor reduction; therefore an effective treatment with low toxicity is needed.

The enzyme COX-2 has been found in large concentrations in colon-rectal carcinomas and in other types of cancer. Recent publications show that non-steroidal anti-inflammatory drugs, specifically COX-2 inhibitor drugs, possess outstanding qualities as a means of reducing tumors and as a chemoprevention treatment for long term use. In this study different innovative new COX-2 inhibitors were synthesized using the frame of biologically active chalcones and to the frame active COX-2 pharmacophores $\text{SO}_2\text{CH}_3$, $\text{SO}_2\text{NH}_3$, $\text{SO}_2\text{NHCOCOCH}_3$ were added. Additionally, the effect of different alkyl chain length and the effect of different electron donors on the binding of the active site of the enzyme was measured on compounds with the different COX-2 pharmacophores $\text{SO}_2\text{CH}_3$, $\text{SO}_2\text{NH}_2$ and $\text{SO}_2\text{NHCOCOCH}_3$. 

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In total, twenty different compounds were synthesized in this study. The effect of the compounds on colorectal cancer cells HCT-116 not expressing the COX-2 enzyme and the colorectal cancer cell CaCO2 expressing COX-2 enzyme was tested. It was found that the drugs were non-selective towards both COX-2 or COX-1 enzymes. The lack of selectivity towards inhibition did not affect the effectiveness of the compounds to inhibit the growth of cancer cells proving that there is more than the inhibition of COX-2 in the process inhibiting colon cancer tumors or any other type of cancer.