

# RESEARCH ROUNDUP



It's our goal here at *Good Health Lifestyles* to bring you the latest in cutting-edge research for a variety of common health issues. Because we believe that knowledge is power—especially when it comes to health—we are digging deeper into the exciting new research from leading medical journals and breaking it down to help you get the most from today's science.

## Andrographis Inhibits Colon Cancer Cells



### THE STUDY ABSTRACT:

**Sharma P, Shimura T, Banwait JK, Goel A. Andrographis-mediated chemosensitization through activation of ferroptosis and suppression of  $\beta$ -catenin/Wnt-signaling pathways in colorectal cancer. *Carcinogenesis*. 2020 Aug 24;bgaa090.**

Colorectal cancer (CRC) remains one of the leading causes of cancer-related mortality in the USA. As much as 50–60% of CRC patients develop resistance to 5-fluorouracil (5FU)-based chemotherapeutic regimens, attributing the increased overall morbidity and mortality. In view of the growing evidence that active principles in various naturally occurring botanicals can facilitate chemosensitization in cancer cells, herein, we undertook a comprehensive effort in interrogating the activity of one such botanical—andrographis—by analyzing its activity in CRC cell lines [both sensitive and 5FU resistant (5FUR)], a xenograft animal model and patient-derived tumor organoids. We observed that combined treatment with andrographis was synergistic and resulted in a significant and dose-dependent increase in the efficacy of 5FU in HCT116 and SW480 5FUR cells ( $P < 0.05$ ), reduced clonogenic formation ( $P < 0.01$ ) and increased rates of caspase-9-mediated

apoptosis ( $P < 0.05$ ). The genomewide expression analysis in cell lines led us to uncover that activation of ferroptosis and suppression of  $\beta$ -catenin/Wnt-signaling pathways were the key mediators for the anti-cancer and chemosensitizing effects of andrographis. Subsequently, we validated our findings in a xenograft animal model, as well as two independent CRC patient-derived organoids—which confirmed that combined treatment with andrographis was significantly more effective than 5FU and andrographis alone and that these effects were in part orchestrated through dysregulated expression of key genes (including HMOX1, GCLC, GCLM and TCF7L2) within the ferroptosis and Wnt-signaling pathways. Collectively, our data highlight that andrographis might offer a safe and inexpensive adjunctive therapeutic option in the management of CRC patients.



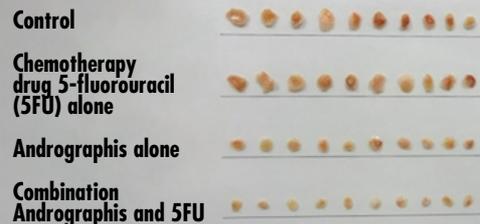
### WHAT THIS MEANS TO YOU:

This latest study features a leaf extract of andrographis, (*Andrographis paniculata*), an adaptogenic herb used in traditional Ayurvedic practice, which can be a powerful ally in the fight against cancer.

Resistance to chemotherapy is an all-too-common condition of standard treatment. Chemotherapy drugs are already toxic to the cancer *and* to the patient, so there's only so far that treatment can go before it becomes too dangerous to pursue further. So when cancer cells are resistant, there appears to be few options. This latest research has found that andrographis has the potential to dramatically improve cancer treatment.

Andrographis increases the effectiveness of chemotherapy in killing cancer cells and reducing cancer cell colonies (involved in metastasis). The first start of the study was in vitro, examining use in two kinds of cancer cell lines: The cancer cells that are sensitive and affected by chemotherapy drugs, and cancer cells that are resistant to these drugs. Andrographis was effective for both. These results were further seen in scientific studies using human colorectal cancer tumor cells and transplanting them into mice.

While andrographis alone was more effective than the chemotherapy drug 5-fluorouracil (5FU) separately, there was a noticeable increase of the effectiveness of 5FU when it was combined with the botanical. Andrographis was one of the key factors in the success of the dual treatment.



While both 5FU and andrographis showed the best results, andrographis on its own was more effective separately than the chemotherapy drug.

What these researchers discovered was that combined treatment with andrographis and 5FU had a synergistic effect that either one on its own couldn't match. Working in tandem, the drug and the botanical regulated specific gene pathways that would otherwise allow cancer cells to develop and thrive. Like leading research with other powerful botanicals, this study shows the potential of integrative cancer treatment, combining advanced natural medicine along with trusted conventional therapies. ■