Curcumin: An unconventional treatment

Alizay Rashid Khan, Muhammad Osama Farooqui

Madam, curcumin, a yellow pigment extracted from Curcuma longa, is traditionally used as a food flavouring and colouring agent in Southeast Asia. Its use dates back to 3000BC. Curcumin is also a component of herbal supplements and is used in skin cosmetic formulations. However, recent studies have shed light on curcumin's role in preventing cancer, atherosclerosis and neurodegenerative diseases.[1]

Curcumin has recently been used in clinical trials to test its efficacy in combatting cancers of the breast, prostate, liver and colon.[2] It is an anti-inflammatory and anti-oxidant compound and these properties render it useful in treating cancer. It triggers apoptosis and stops cancer cells from dividing while also decreasing the vascularity of tumours and metastasis.[1] Unlike chemotherapy drugs, curcumin kills cancerous cells only, leaving unaffected cells unharmed.

This wonder drug of sorts has many benefits. It may lower the risk of heart disease by improving endothelial function. It leads to improved brain function and can also be used to treat Alzheimer's disease and depression. Its anti-inflammatory property has shown to be beneficial in treating rheumatoid arthritis and may be effective in curing inflammatory bowel disease as well.[1]

Its mechanism of action is both intrinsic and extrinsic. The intrinsic pathway takes place in mitochondria; it starts with the activation of a cell cycle regulator gene, p53 tumour suppressor gene as well as through members of B cell lymphoma 2 family.[3] Upregulation of p53 activates proapoptotic members of Bcl2 family, namely Bcl2 associated x protein (Bax) and Bcl2 antagonist killer (Bak) which forms holes in the mitochondrial membrane and leads to the release of cytochrome c and finally apoptosis.[4] The extrinsic mechanism includes cell death via activation of cell surface transmembrane death receptors. Curcumin also down regulates NFkB and suppresses AP-1 activity.

Curcumin may prove to be a favourable drug in treating many diseases. Its use as an unconventional remedy for cancer is a subject of interest as it is linked to very mild side-effects like nausea and diarrhoea. However, it has very low solubility coupled with poor bioavailability following administration via the oral route.[5] As curcumin is fat soluble it may be more effective taking it with a fatty meal. More clinical trials incorporating curcumin must be conducted to test its efficacy via different routes of administration as a regimen for cancer and other diseases.

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References

1. Gunnars K. 10 Proven Health Benefits of Turmeric and Curcumin. Authority Nutrition. 2018.
2. Basnet P, Skalko-Basnet N. Curcumin: an anti-inflammatory molecule from a curry spice on the path to cancer treatment. Molecules 2011;16:4567-98. doi: 10.3390/molecules16064567.
3. Thomadaki H, Scorilas A. BCL2 family of apoptosis-related genes: functions and clinical implications in cancer. Crit Rev Clin Lab Sci 2006;43:1-67.
4. Ehrenschwender M, Bittner S, Seibold K, Wajant H. XIAP-targeting drugs re-sensitize PIK3CA-mutated colorectal cancer cells for death receptor-induced apoptosis. Cell Death Dis 2014;5:e1570. doi: 10.1038/cddis.2014.534.
5. Hsu CH, Cheng AL. Clinical studies with curcumin. Adv Exp Med Biol 2007;595:471-80. doi: 10.1007/978-0-387-46401-5_21

Third Year Student, Dow Medical College, Karachi, Pakistan.
Correspondence: Muhammad Osama Farooqui.
Email: mdosama96@gmail.com