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## Chemical modification of curcumin enhances its anti-cancer, anti-inflammatory and anti-leishmania activities

Adel Hidmi<sup>2</sup>, Zaidoun Salah<sup>1</sup>, Sharehan Ariqat<sup>1</sup> and Abedelmajeed Nasereddin<sup>1</sup> <sup>1</sup>Al-Quds University, Palestine <sup>2</sup>Birzeit University, Palestine

Curcumin is the active ingredient in the turmeric rhizomes. The diarylheptanoid structure of curcumin has been found in many recent studies to possess a broad range of therapeutic and pharmacological benefits. Curcumin was shown to have antioxidant, anti-inflammatory, antileishmanial, anticancer and other effects. Despite this potential, curcumin has two main disadvantages associated with its structure: poor stability and low bioavailability due to its low water solubility. Also, nitric oxide (NO) holds a great potential for NO-based treatments for a wide variety of diseases. In order to check the combined effect of curcumin and NO, we synthesized a nitro-curcumin hybrid through nitrate esterification reaction at the keto-enol position of curcumin and simultaneous aromatic nitration. Here, our results show NO-curcumin has a more potent anti-cancer as well as antileishmanial activities compared to non-modified curcumin. Our preliminary results indicate that NO-curcumin has no cytotoxic effects on normal cells. Therefore, the modified curcumin compound (NO- curcumin) may serve as a promising alternative to the currently used drugs and continues to be researched in further related studies.

### **Recent Publications:**

- 1. Jantarat C (2013) Bioavailability enhancement techniques of herbal medicine: a case example of curcumin. Int J Pharmacy Pharm Sci. 5:493-500.
- 2. Kim K C, Lee C (2010) Curcumin induces downregulation of E2F4 expression and apoptotic cell death in HCT116 human colon cancer cells; involvement of reactive oxygen species. Korean J Physiol Pharmacol. 14(6):391-397.
- 3. Keeble J E and Moore P K (2002) Pharmacology and potential therapeutic applications of nitric oxide-releasing nonsteroidal anti-inflammatory and related nitric oxide donating drugs. Br J Pharmacol. 137(3):295-310.
- 4. Moghadamtousi S Z, Abdul Kadir H, Hassandarvish P, Hassan T, Abubakar S and Zandi K (2014) A review on antibacterial, antiviral, and antifungal activity of curcumin. BioMed Res Int. 2014:186864.
- 5. Changtam C, de Koning H P, Ibrahim H, Sajid M S, Gould M K and Suksamrarn A (2010) Curcuminoid analogs with potent activity against Trypanosoma and Leishmania species. Eur. J. Med. Chem. 45(3):941-56.

#### Biography

Adel Al Hidmi obtained his PhD from The Hebrew University of Jerusalem, department of medicinal chemistry & natural products. He is currently working as a research and lecturer at Birzeit University.

ahidmi@birzeit.edu

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