Characterization metal-chelating properties of the pharmacological Indian spice Curcumin using budding yeast as an eukaryotic model

Sajeda Ttabash, Elah Pick, Yoram Gerchman

Extensive research over the past half century has shown that the polyphenol Indian spice curcumin may have broad biological and medicinal effects including efficient anti-oxidant, anti-inflammatory and anti-cancer therapy in addition to preventive properties for neurodegenerative diseases. Curcumin had shown to have iron chelation in vitro and in mammalian cells. In our study we examine the curcumin chelation potential with other metals besides iron in vitro and in yeast cells as eukaryotic system. We found that curcumin inhibits yeast cell proliferation by depleting the exogenous pool of metal ions from the growth medium and intracellular reserves of metal ions. By adding exterior metals, iron ions and copper ions, cells inhibition was suppressed, this did not occurred when adding other studied metals: zinc, magnesium, calcium, aluminum, nickel and cadmium to yeast cells. This means that curcumin has the ability to chelate iron and copper in yeast cells but not with other metals. In parallel, curcumin has demonstrated binding ability to iron ions in vitro which partially enhances the results in yeast cells. The chelation potential of curcumin can be offered as a possible solution for diseases related to metals accumulation problems especially in neurodegenerative diseases.

Sajeda Ttabash, email address:

su.masque@gmail.com

Dr. Elah Pick, email address:

elahpic@research.haifa.ac.il

Dr. Yoram Gerchman, email address:

gerchman@research.haifa.ac.il