Conclusion

Since ancient times, curcumin has been used in Asian countries against human ailments. Modern science has delineated the molecular basis for the pharmaceutical uses of curcumin. Multiple studies over the past decade have indicated the safety and efficacy of this polyphenol.

Curcumin has considerable neuro-protective and anti-cancer properties but is rapidly eliminated from the body. However, the penetration of curcumin in brain is limited due to its rapid systemic elimination besides it does not easily cross blood brain barrier. Therefore, the therapeutic efficacy of curcumin is restricted due to its short systemic retention in circulation and also in brain. Therefore, it was decided that if a prodrug like mono or di-acetate is prepared it could cross the blood brain barrier exactly the way heroin which is a di-acetate of morphine reaches the brain. On similar perception it was investigated to develop a di-acetate which after crossing the blood brain barrier may get cleaved by already known enzyme. The curcumin derivative was synthesized and compared with the curcumin for the ability to cross the blood brain barrier. Conversion of curcumin di-acetate and/or identification of metabolite in brain were evaluated by HPLC and LC-MS after the i.v. administration in rats. Curcumin di-acetate cross the blood brain barrier 10 times more as compared to the parent compound and gets converted into the parent compound in brain by the enzymatic hydrolysis of the di-acetate.

Basic requirement for any chemo preventive agent demands that it should be non-toxic to normal and healthy people, have high efficacy against multiple sites, should have a known mechanism of action, should be easily available, should be low cost and should be acceptable to most of the human population. Despite the lower bioavailability, curcumin has potential therapeutic value against various human diseases including cancer, cardiovascular diseases, diabetes, arthritis and neurological diseases. Enhanced bioavailability of curcumin in the near future is likely to bring this promising natural product to the forefront of therapeutic agents for the treatment of human disease.