

ANTI-OBESITY AGENT HCA FOR GENERATION Y

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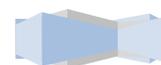
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As per the recent report and government survey an approximate estimation on population states that out of a mass of 400 children and adolescents one is to have Type 1 diabetes; also indicates that one in every three children born in 2000 will suffer from obesity, which as noted is a predominant Type II precursor” Tim Holden [1].

Generation Y or Millennial Generation members are the demographic cohort following Generation X. Though there are no precise dates when the generation starts, the experts say they were born between the early 1980s to the early 2000s and this Y generation is threatened with increased body mass index (BMI: defined as mass in kilograms divided by square of the height in metres) or we can say Obesity. Obesity is becoming a catastrophic physiological challenge for the present generation human race and in the near future it will overcome the consequences of under nutrition, which is a significant adjuvant to the poor and ill health conditions [2]. CAG London, report 2001 in *Tackling obesity in England*, stated “Obesity places an enormous financial burden on the health service, with the direct costs being at least £ 500 million per year” [3].

Before the discoveries of laws of Health, the Nature has taught very well to the human being how to lead a healthy life. But ironically on this Earth on one hand millions don't get proper food, roam with their skeletal appearance and on the other hand, there are the people who have enough of it and have a threatened life with obesity and untimely death. According to World Health Statistics report 2013 (WHO), globally 10% of adult male and 14% of adult female are obese and during 2005-2012, a total of 6.6% increase in overweight children aged below Five [4,5]. Though losing weight has become a modern day obsession, in the developed world, various factors do contribute to the increased number of overweight and obese individuals. This may be due to busy schedules, which arises strong affinity towards easily and cheaply available fast foods, which are

energy dense food high in trans fats and sugars [6]. FF gives FF i.e.; these Fast Foods lead us to Fast Fat. In fact, obesity is a complex disorder of appetite regulation and energy metabolism controlled by specific biological factors. Hypertension, metabolic syndrome, diabetes, dyslipidaemia, myocardial infarction, stroke and its related complications are normally associated with obesity. Obesity is not a pathological disease, but its categorization as such could have an insidious influence on the society resulting in failure in efforts to remedy the condition and its need for prevention. Instead Obesity should be treated as a physiological disorder, not as a physical disorder [7, 8]. Whenever prevention fails, medical treatment of obesity may become an obligation and it is more fruitful when we can acquire the medicinal treatment directly from nature in



its natural form which is more preferred and healthy rather than going for chemical and surgical treatment [9]. Alternatively, inhibition of carbohydrate to fatty acid conversion reaction can lead to obesity control. This can be done by assay of (-)-HCA, which inhibits the formation of ATP-citrate lyase, responsible for lipogenesis. ATP-citrate lyase (ATP-citrate oxaloacetate lyase, EC 4.1.3.8) regenerates acetyl-CoA, which is the ultimate source of all the carbon atoms of fatty acids being synthesized in the body. Thanks to Lewis and Neelakantan (CFTRI, Mysore, India, 1965), who for the first time reported about Hydroxycitric acid (HCA) and its four different isomers in *Garcinia cambogia* and *Hibiscus sabdariffa* [10, 11]? The tropical states of Asia, Africa and Polynesia is a home to about 200 species of *Garcinia*, of which 30 species are found in India [12]. Watson *et al.* have first reported powerful inhibition of ATP-citrate oxaloacetate lyase by (-)-HCA with purified enzyme from rat liver [13]. HCA has been successfully isolated from other species of *Garcinia* and is a derivative of citric acid (1, 2-dihydroxypropane-1, 2, 3-tricarboxylic acid). (-)-HCA being a potent inhibitor of ATP-citrate lyase limits the availability of acetyl-CoA units required for fatty acid synthesis and lipogenesis. Many *in vitro* and *in vivo* studies have demonstrated that (-)-HCA suppresses the *de novo* fatty acid synthesis and lipogenesis. Bray and Greenway reported in Pharmacological approaches to treating the obese patient, that (-)-HCA has been used as a potentially safe and effective pharmacological intervention for obesity for at least 30 years [14].

Nowadays, newfangled chemicals are becoming the sustenance for the pharmaceutical and consumer product industries. But, we are still far behind in

anticipating precisely human toxicity from *in vitro* data and their assessment of safety remains controversial [15]. For an effective anti-obesity drug it must ultimately have an impact on energy intake, energy expenditure, or both. This is in strict relation to the law governing thermodynamics ie the first law which states that the amount of stored energy is equal to the difference between energy intake and expenditure. Here we can see that (-)-HCA has got tremendous anti-obesity activity and numbers of brand capsules are available in the market produced through expensive chemical extraction procedures; for example, *Garcinia cambogia* extract (Kittchin, USA) at US \$25.00, containing 60% of pure (-)-HCA and the recommended dose for weight loss is 2-3 gm per day. Nature has endowed us with its precious gifts and as (-)-HCA is readily available in the *Garcinia* fruit, it is advisable to consume fresh fruit and fruit juices, as such initials would encourage cultivation and conservation of the germplasm and thereby it can provide a potentially durable approach to fight against obesity [16].

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