Comments and additional information on NTP Technical report on the

TOXICOLOGY STUDIES OF GREEN TEA EXTRACT

By

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As an expert consensus on available data on chronic toxicity and carcinogenicity of green tea extracts, this evaluation report on toxicology and carcinogenesis studies of green tea extracts on laboratory animals constitute a very valuable resource for anyone with a particular interest in understanding the safe use of these therapeutic botanicals. The text is extremely well written, and is supplemented by excellent full color images including tables and related chronologies. Although the report necessarily reviews a wealth of data of available sources on toxicity of green tea extracts, however to successfully bridge the gaps it is recommended to consider the multinational research approaches on the topic to integrate well established theories on the safe uses and benefits of green tea and their extracts. Taiyo Kagaku, Japan, one of the leaders in manufacturing and pioneering research concerning green tea catechins, is actively engaged in supporting the beneficial effects of green tea on human health while also addressing its controversial effect for chronic toxicity. The recently published book “Green tea polyphenols: Nutraceuticals of Modern Life” CRC press (edited by Juneja & Kapoor et al., ISBN 978-1-4398-4788-6; 2013) is a concise monograph on the well-known functional ingredient and discusses the green tea research contributed by global experts in the field.

Concerning to the toxicity of green tea catechins, the Japanese researchers have also steped forward and examined chronic toxicity and carcinogenicity of

green tea catechins in Wistar rats and published the findings as original article in the Journal of Toxicological Sciences (Yoshida et al., J. Toxicol. Sci., 36(3) 297-311, 2011). In this regard, International Life Science Institute (ILSI), Japan has constituted a “Tea Task Force” along with four major Japanese green tea manufacturing companies (Taiyo Kagaku Co. Ltd., Mitsui Norin Co. Ltd., Itoen Ltd., and Kao Ltd.). Recently, ILSI has presented a review of epidemiological reports on the health effect of green tea catechins in the liver with a particular attention on the cases of hepatitis, and addressed the concerns of hepatotoxicity and liver carcinogenesis in ICOS 2103 conference held during November 6-8, 2013 at Shizuoka, Japan (Abstract: IL-S-4; Suzuki et al., ICOS 2013 Symposium, p-92). Wherein, out of 436 hits of green tea toxicity concerned literature from electronic databases [Medlien, Embase, Biosis, Toxline and CiNii; key words… green tea, catechins, epidemiology, clinical studies], 36 clinical study reports (English 28; Japanese 8) were selected and reviewed by ILSI Tea Task Force members. Not a single clinical report have concluded any risk increase, however in contrast, most of the reports indicated that green tea catechins consumption reduces the hepatic risk. Further, Fukuzawa et al. have recently reported that green tea catechins along with controlled diets and exercise therapy can improve anthropometric parameters and therefore help prevent the progression of NASH through their antioxidant and anti-inflammatory properties by reducing oxidative stress in the nonalcoholic steatohepatitis (NASH) patients (Fukuzawa & Kapoor et al., Journal of Functional Foods, online DOI: 10.1016/j.jff.2014.04.010).

Furthermore, ILSI Japan has recently conducted a systematic meta-analysis

on selected human clinical studies reports on liver hepatitis and carcinogenicity effects of green tea catechins, wherein after secondary evaluation for 35 randomized clinical test (RCT) studies only four reports indicated the mild possibility of the damage of liver with higher doses (> 800 mg) of green tea catechins consumption for long period of time. However, the report concluded that the impact of these four papers was not significant on the meta-analysis (summarized as relative risk plots vs bias assessment plots), as majority of RCT studies reported a positive compliance of the green tea catechins consumption. The final report on the meta-analysis studies is currently under preparation and available for the publication in May/June 2014.

Our main concern of writing this report is to provide additional and adequately informative information on the covered topic. The documented published studies related to this report are also attached herewith for the ready reference.