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Reply to: Herbal tea consumption and the liver – all is not what it seems!

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Reply to

We would like to thank Philips and Augustine for their valuable comments on our study on coffee and tea consumption in relation to liver health in the general population.^{130,451}

In our study we show that both coffee as well as herbal tea are associated with lower liver stiffness independent of many potential confounding factors. In their letter, Philips and Augustine raise the valid concern that papers like ours may convey a general message that consumption of tea containing herbal extracts or other complex mixtures is evidently beneficial and safe. Naturally, this can be a dangerous assumption. Consumption of unknown and non-FDA approved herbal extracts, concentrated infusions, or oral preparations of green tea can indeed, occasionally, cause hepatotoxicity and even acute liver failure.⁴⁵² We understand that, especially in Asian countries such as India (where the authors work) and China, consumption of herbal compounds may be more widespread, may be part of traditional medicinal remedies⁴⁵³ and may involve complex and potentially hazardous preparations.⁴⁵⁴

Therefore, it is important to understand the study population we have examined. The participants in our study were nearly all community dwelling elderly Caucasians, who generally follow a traditional Dutch diet. Due to limitations of the Food Frequency Questionnaire, we could not provide more detailed information on the exact type of herbal tea consumed.^{98,99} However, it is well-known that consumption of herbal tea in The Netherlands is typically limited to mainstream, pre-packaged, and commercially available herbal teas, such as chamomile, rooibos and mint tea (<http://www.rivm.nl/Onderwerpen/V/Voedselconsumptiepeiling/>). Moreover, in our study, consumption of herbal tea was infrequent: only one-third of the participants consumed herbal tea with a median of 0.80 cups per day (IQR 0.45 – 1.16). Studies who have reported on herbal preparations and liver injury generally reported ingestion of much higher dosages and unknown mixtures.⁴⁵² Although we cannot exclude the possibility that some of our participants may have consumed unknown herbal preparations or extracts, it is important to emphasize that liver enzymes were normal in 99% of all participants.

Another concern raised by Philips and Augustine relates to our discussion about the existing literature on green tea and liver health. They particularly question the validity of the papers we cited, in particular, the cross-sectional study by Imai et. al. that concluded that higher green tea consumption (even over 10 cups per day) was associated with lower prevalence of cardiovascular disease and lower serum transaminases.⁹⁵ Philips et al. argue that, after this paper was published, no other studies have confirmed their findings. However, as Philips and Augustine themselves state in their letter, our study is the first to examine in depth the relation of tea intake and liver health in a large general population. As a result, we discussed prior studies on this topic, even those with conclusions that conflict with ours. Namely that we show that green tea was not associated with liver health.¹³⁰

A final issue raised by the authors of this letter is the potential toxicity of green tea extract itself. Indeed, cases of severe drug-induced liver injury associated with consumption of green tea *extracts or concentrated infusions* have been reported (<https://livertox.nih.gov/GreenTea.htm>). It is important, however, to realise these rare occurrences are almost exclusively related to the use of green tea supplements, extracts or concentrated infusions rather than the use of regular beverage consumption. Also, there is the issue of potential toxic contamination, as the composition of these herbal products is not always known and tested.⁴⁵⁴ We did not examine extracts or supplements but rather tea consumption itself, which is generally believed to be safe at moderate, regular, and habitual use (NIH).⁴⁵⁵ To conclude, we thank Philips and Augustine for their valuable comments. As we have clearly stated in the conclusions of our paper, we agree that it is premature to make any firm recommendations on herbal tea consumption and liver health. Undoubtedly, more studies are needed to study the cause-effect relation between consumption of coffee, herbal tea, and liver health. Moreover, as with any scientific study, caution is always warranted when translating study results to clinical practice recommendations.