

Letter to Editor

Reduction of serum cholesterol in hypercholesterolemic rats by Guar gum

Mohammad Reza Haeri

In the previous issue of AJP an article under the title of "Reduction of serum cholesterol in hypercholesterolemic rats by Guar gum" was published (Samarghandian et al., 2011), which raised some question to be discussed more. In the "Animal Experimental Procedure" section, for induction of hypercholesterolemia, rats have been fed a chow supplemented with 18% corn oil. This diet is absolutely a high fat diet but it could not induce hypercholesterolemia because cholesterol is an animal or fungus steroid and oils with plant origin have no or little amount of cholesterol (Horton et al., 2002, Behrman et al. 2005). Therefore plant oils could not increase cholesterol levels in rats and are not used routinely for induction of hypercholesterolemia. Authors have cited five studies in order to support their protocol (Pratchayasakul et al., 2011, Guo et al., 2011, Bajerska et al., 2011, Suanarunsawat et al., 2010, Zhao et al., 2011). However in all cited references (except for Zhao et al that has not been listed in references list), animal fat such as lard with or without corn oil were used as the hypercholesterolemic diet that is not used in the current study. It is clear that authors and coworkers have not followed the exact procedure mentioned in the articles they cited, therefore elevation of serum total cholesterol levels mentioned in the figure 2 (results section) may not be possible.

Department of Biochemistry, School of Medicine, Qom University of Medical Sciences, Qom, I. R. Iran

*Corresponding Author: Tel:+982517831370
E-mail: haeri@muq.ac.ir

In my opinion this can be a typing error, but there is not any animal fat as an ingredient of the diet of hypercholesterolemic group (control) as detailed in table 2 either.

In conclusion the exact model of hypercholesterolemia has not been produced by the mentioned procedure and none of the provided results in the remaining paper could be accurate. However there is an article cited in the body of the manuscript (Zhao et al., 2011) which has not been listed in the references section. In my opinion the above-mentioned issues warrant further clarification by the authors.

References

- Bajerska J, Wozniwicz M, Jeszka J, Drzymala-Czyz S, Walkowiak J. 2011. Green tea aqueous extract reduces visceral fat and decreases protein availability in rats fed with a high-fat diet. *Nutr Res.* 31: 157-164.
- Behrman E. J. and Gopalan V. 2005. Cholesterol and Plants. *J. Chem. Educ.* 82: 1791-1792.
- Guo F, Li Y, Sun C, Niu Y, Feng R. 2011. Effects of high-fat diet on blood lipids in rats. *Wei Sheng Yan Jiu.* 40:40-42.
- Horton, R. H., Moran, L. A., Ochs, R. S., Rawn, D. J. and Scrimgeour, K. G. (2002) "Principles of Biochemistry" (3rd edn.), PP. 275, New Jersey
- Samarghandian S, , Hadjzadeh M, Sadat Davari A, Abachi M. 2011. Reduction of serum cholesterol in hypercholesterolemic rats by Guar gum. *AJP*, 1: 36-42.
- Suanarunsawat T, Boonnak T, Na Ayutthaya WD, Thirawarapan S. 2010. Antihyperlipidemic and cardioprotective effects of *Ocimum sanctum* L. fixed oil in

rats fed a high fat diet. *J Basic Clin Physiol Pharmacol.* 21: 387-400.

Pratchayasakul W, Kerdphoo S, Petsophonsakul P, Pongchaidecha A, Chattipakorn N, Chattipakorn SC. 2011. Effects of high-fat diet on insulin receptor function in rat hippocampus and the level of neuronal corticosterone. *Life* 88: 619-627.

Zhao *et al.*, 2011: There is not any article with Zhao as author in references list of the paper.

About the letter to the editor, we would like to express our sincere thanks for attention to our paper entitled "Reduction of serum cholesterol in hypercholesterolemic rats by Guar gum " published in *AJP*.

As we mentioned in our article, in the animal experimental procedure section for induction of significant increase of serum cholesterol in high-fat diet groups *vs.* normal diet group, we fed the rats chow supplemented with 18% corn oil. In most of the cited articles in our study, there were two methods for induction of hypercholesterolemia in rats. One is adding certain amount of cholesterol in rats' regimen. Although this method is very expensive, it brings about significant high levels of cholesterol in rats in a short period of feeding (Ploumidou *et al.*, 2010). The other method is adding some varieties of high fat diet in the rats' regimen but duration of induction of hypercholesterolemia *vs.* normal rats depends on the kind of high fat diet used. Our experience showed that sex and age of rats were also crucial. So that, when we selected rats about 200 g, we would not be able to induce hypercholesterolemia till 20 weeks.

Therefore, despite what mentioned in his correspondence to the journal, there is no routine method for induction of hypercholesterolemia in rats. Actually by adding some oil in normal diet after a period of time (depending on the type of oil) hypercholesterolemia is inducible. The five studies we cited in our paper in *AJP* also corroborate this, since they induced hypercholesterolemia in rats

by high fat diet regimen but with completely different compositions of fat. Therefore, there are variety of combination of oil called high-fat diet which depend on oils and composition of oils for induction of hypercholesterolemia. For example, Partchysant showed that the serum cholesterol increased in the rats (200 g) fed with lard & corn oil in 8 weeks period (Pratchayasakul *et al.*, 2011). Guo and co-workers fed the rat with corn oil and coconut butter and after a week they could show hypercholesterolemia in the rats (Guo *et al.*, 2011). Bajersak and co-workers fed the rats with sunflower oil and lard, and after 8 weeks, serum cholesterol in rats increased significantly (Bajerska *et al.*, 2011).

In our experiment we fed the rats a chow supplemented with 18% corn oil and the level of cholesterol was increased after 12 weeks. This diet is an absolutely high fat diet, although corn oil has not considerable amount of cholesterol, it possesses high amount of cholesterol-raising saturated fats compared to other vegetable oils. In fact, saturated fats are typically present in foods from animals and also some plants (especially corn oil). Fats called poly-unsaturated and mono-unsaturated, which are found in safflower, soy, sunflower seed and canola oils, may not increase serum cholesterol level when they are used instead of saturated fats as compared to saturated fats. Corn oil actually has a higher amount of saturated fats and lower amount of so-called good fats than other commonly used vegetable oils. Corn oil contains copious amounts of saturated fat and in long term use can lower HDL-cholesterol along and increase the LDL-cholesterol. Although, the feeding of corn oil may not increase blood cholesterol levels in the human beings, this is not true for experimental animals. Therefore, we focused our attention on the saturated fat content of corn oil, which is higher than that of canola, sunflower or safflower oils. As we expected, because of low level of cholesterol in this regimen (high fat diet

Letter to Editor

contains 18% corn oil) we could not get a significant increase in the level of cholesterol in high fat diet group vs. the rats received normal diet in young rats till 20 week, but after continuing feeding for 12 week in the aged male rats (270g) with high fat diet, our data showed significant increase in serum cholesterol level vs. the rats fed with normal diet (2.5% corn oil).

References

- Bajerska J, Wozniewicz M, Jeszka J, Drzymala-Czyz S, Walkowiak J. 2011. Green tea aqueous extract reduces visceral fat and decreases protein availability in rats fed with a high-fat diet. *Nutr Res*, 31: 157-164.
- Guo F, Li Y, Sun C, Niu Y, Feng R. 2011. Effects of high-fat diet on blood lipids in rats. *Wei Sheng Yan Jiu*, 40: 40-42.
- Ploumidou K, Kyroudi-Voulgari A, Perea D, Anastasiou I, Mitropoulos D. 2010. Effect of a hypercholesterolemic diet on serum lipid profile, plasma sex steroid levels, and prostate structure in rats. *Urology*. Dec, 76: 1517. e1-5.
- Prachayasakul W, Kerdphoo S, Petsophonsakul P, Pongchaidecha A, Chattipakorn N, Chattipakorn SC. 2011. Effects of high-fat diet on insulin receptor unction in rat hippocampus and the level of neuronal corticosterone. *Life*, 88: 619-627.