

# A Preliminary Report on Effects of Islamic Fasting on Lipoproteins and Immunity

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## Abstract:

*The effect of Islamic Fasting on lipoproteins and immunity was evaluated in 10 subjects. There was a significant improvement in cell-mediated immune responses as indicated by an increase of helper inducer T-Cell count, helper cell/suppressor cells ratio, cell functional index, total system function index, and Pokeweed MIT index. Of the immunoglobulins, the IGE showed a moderate increase. The lipoprotein changes were in the form of increased cholesterol without any increase of HDL, a pattern which has a stimulating effect on the immune responses.*

*In conclusion, we feel that these preliminary results indicate a favorable effect of Islamic fasting on immunity. Further studies are needed.*

## Introduction

Islamic fasting, i.e. refraining from eating, drinking, and smoking from dawn to sunset for a period of one month, is expected to have some physical health benefits in addition to its spiritual benefits as a form of worship. This expectation is based on the belief that a Divine prescription must be good for us and also a previous study by one of us (A.E.) which showed that the following of Islamic teachings in general leads to better health and reduces the incidence of disease.<sup>1</sup> The question facing us was what benefits there are and how they are achieved.

Since fasting has to do with restricted or modified food intake, we initially thought that it may affect the lipoproteins. We hypothesized that Islamic fasting will increase high density lipoprotein (HDL) and decrease low density lipoprotein (LDL) with an improved LDL/HDL ratio. Such a change is likely to decrease the risk of coronary artery disease.<sup>2,7</sup> A review of the literature revealed only one study which has specifically evaluated the effect of Islamic fasting on cholesterol and serum lipids.<sup>8</sup> In that study there was a significant increase of cholesterol and an insignificant decrease of triglycerides following fasting. However, in that study, the lipoproteins fractions were not measured. A pilot study was undertaken on a limited number of fasting volunteers, however this failed to confirm our hypothesis. The HDL did not increase and the LDL/HDL ratio did not improve. Since we knew that there must be some beneficial effect of Islamic fasting, we changed our protocol and included parameters to evaluate the immune responses in fasting subjects. This paper reports the results of these studies.

## Material and Methods

Ten fasting subjects were evaluated. There were 7 males and 3 females, ranging in age from 13 to 50 years with an average age of 32.5 years. The subjects were advised not to change their usual diet or activities, and the only difference they went through during the fasting month was the change of eating pattern. They usually ate one main meal at sunset and another smaller meal just before dawn. Lipoprotein profile, immune globulin profile, and a complete blood count were measured in all of them at the beginning of the fasting month, during the third week of the month, and at the end of the month. In 4 of 10 subjects, a complete differential lymphocyte profile was also obtained and 2 of 4 had additional comprehensive studies for evaluation of the lymphocyte function.

## Results

Serum cholesterol increased from a mean of 179 mg/dl (range 152—205) to 195 mg/dl (range 173—234). There was no significant effect on triglycerides, HDL, or LDL; serum immunoglobulin did not change significantly. Mean serum IGE increased slightly from 206.1 to 262.2. There was a significant improvement in cell-mediated immunity. Total helper inducer T-Cell increased from a mean of 809 (range 688—930) to 1243 (range 746—1740). The ratio of helper/suppressor cell also increased from 1.1 to 1.7. Of note is the improvement in T-Cell function studies, particularly the cell function index which is increased from 0.05 -0.29, total system function index from 0.042 to 0.42 (range 0.11—0.61) and Pokeweed MIT index from 62.2 to 159 (range 91.8—227.7).

## Discussion

The results of this study show that Islamic fasting does not increase serum HDL nor improve the LDL/HDL ratio. On the contrary, there was an increase of serum cholesterol. The immunoglobulins showed no significant change except for a slight in-

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*crease of IGE.* However, there was a definite improvement of cell-mediated immunity as indicated by the improved helper inducer T-Cell count, helper/suppressor T-Cell ratio, the *cell function index*, the *total system function index*, and the Pokeweed MIT index.

Although the changes of the lipoproteins after fasting initially appeared to be disappointing with regard to atherosclerosis and risk of coronary heart disease, fasting is favorable to the immune system and immunity. Recent studies have shown that HDL has a suppressive effect on certain immune responses such as lymphocyte mitogen stimulation and T-Cell allograft immunity,<sup>9</sup> and that cholesterol and LDL have a stimulating effect on the immune responses, unlike HDL.<sup>10</sup>

The fact that these lipoprotein changes occurred in all fasting subjects confirms and adds strength to the findings of improved immune responses of the lymphocytes in the four subjects tested. Other investigators have found similar increase of cholesterol in subjects eating one large meal as opposed to frequent small meals,<sup>11</sup> or when one large meal and two small meals are consumed as opposed to three equal meals.<sup>12</sup> These findings are in line with our data and the eating

pattern in these studies resembles the pattern of eating during Islamic fasting. Other studies have shown that moderate starvation enhances some selected parameters of host response.<sup>13-16</sup>

The question of how Islamic fasting achieves the improved immune response may have more than one answer. One possible way could be through the increased cholesterol levels. Another mechanism could be through the stress reducing effect of fasting if performed as a spiritual worship. Stress is known to reduce immunity and stress reducing modalities should be expected to improve it. It is quite possible that a multitude of mechanisms are acting together and are responsible for the results although some of them may not be known. In any case, it is exciting to see the favorable effect of fasting on the immune responses since they play a vital role in the health and healing of the body, and in the prevention of diseases such as infections and cancers.

We realize that our results are only of a preliminary nature and that the number of subjects studies is small. We plan to expand this study to include a larger number of subjects and to evaluate various types of optional fasting such as the recommended 3 days a month, the 2 days a week, or the alternate day fasting variety.