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Breakfast Skipping, Atherosclerosis Disease, and Free Fatty Acids



I read with great interest the study by Uzhova et al. (1) and found the odds ratios for atherosclerosis associated with breakfast pattern especially impressive. Those who skip breakfast (breakfast skippers) are at greater risk than those who take a low-energy breakfast (LEB), whereas those who take a high-energy breakfast have the lowest risk.

The challenge is to understand these results in the light of physiology. It is known that after overnight fast, free fatty acids (FFAs), a primary source of energy, are increased in the morning. Additionally, sleep restriction relative to normal sleep results in increased FFA levels during the early morning hours. This may be counteracted by a morning high-carbohydrate meal, which can lower the level of blood FFAs, as it is known that insulin inhibits lipolysis. However, even among those who do not skip breakfast, FFA levels peak in the morning (2).

Coincidentally, myocardial infarction and sudden cardiac death also peak in the morning (3). This relationship is explained in my 2017 study (4). The physiological mechanism is described in my 2016 study (5): FFAs together with (even mild) states of acidemia (blood pH level of <7.35) shape the context for formation of fatty acid micelles and vesicles with an acidic core, which fuse with endothelia, create inflammation, and thereby may initiate atherosclerotic plaque formation. At the sites of vesicle attachment, release of the acidic core creates

an acidic spot. Calcification occurs in the presence of free calcium that is released from circulating albumin due to loss of affinity to calcium as blood pH drops below normal levels.

The preceding physiological mechanism also explains why LEB poses a lower risk than skipping breakfast. In fact, LEB reduces the level of FFAs by only a small amount, thus only slightly alleviating the critical conditions for the formation of FFA vesicles.

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<https://doi.org/10.1016/j.jacc.2017.10.101>

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Please note: Dr. Reis has reported that he has no relationships relevant to the contents of this paper to disclose.

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Is Skipping Breakfast a Marker for Current Smoking?



Recent publications from the PESA (Progression of Early Subclinical Atherosclerosis) (1,2) supporting associations between skipping breakfast, social eating, and prevalence of subclinical atherosclerosis and from the Japan Public Health Center-based study (3) of clinical stroke are evocative and require additional analyses in other populations. These studies, which are difficult to accomplish, may require statistical manipulations to adjust for the many differences among the observations being analyzed. These statistical manipulations may mask other important observations. The studies in Spain and Japan have higher prevalence of smoking than those reported in the U.S. Health Professionals Study (4). In each of