Authors’ Response to Commentary

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The aging of the world’s population due to (a) an increasing absolute number of elderly people and (b) an increased life expectancy is well established (1). However, in what way proportional “healthy” life expectancy or perhaps, in other words, “a satisfactory quality of elderly life” can be achieved, is still an important topic of multiple research. Because sensory properties of food are almost exclusive factors that remain important until the very last end (2), it is of great value to investigate the decline in taste and smell perception and its impact on food enjoyment and total food intake. In her comment, Schiffman advocates a greater understanding of the impact of especially different types of taste and smell dysfunction on appetite in relation to developing and providing cost-effective health care systems for the elderly population. Different types of chemosensory losses may have divergent effects on food intake and nutritional and health status.

Schiffman argues that poor appetite is one cause of decreased energy intake. Consequently, effects on macro- and micronutri-ent status, clinical nutritional parameters, and finally overall functioning are induced. We fully agree that this may be especially the case in critically ill patients and perhaps frail elders, who accordingly have a high risk of developing deficiencies. We, however, could not confirm this premise in our study (3). We were able to demonstrate a firm relationship between sensory perception and appetite, but low scores on the appetite questionnaire were not significantly related to low dietary intake, adverse quality of dietary intake, or low body mass index (BMI) in our elderly population. A possible explanation may be that institutionalized elders eat because they understand that they simply have to eat. Another reason may be that they do not have to prepare the hot meal themselves anymore. If the hot meal is served, they may eat it because this older generation will not throw food away. Free-living elders with a poor appetite may be reluctant to prepare something regularly. It may just be too big an effort to overcome, and when there is no control by a central kitchen or staff, they may end up with only a sandwich.

To our knowledge, there is no available uniform, validated approach of measuring appetite and feelings of hunger. The questionnaire developed for our study was the first attempt to expand the concept of appetite in a direction that is more than one question only. The internal validity was satisfactory, but still a lot of work has to be done with respect to the external validity. In our department, we are currently trying to validate the questionnaire with objective measures such as hormone levels, as leptin or cholecystokinin.

In an earlier study by Schiffman and Warwick (4) it was observed that flavor enhancement could improve palatability and intake. We, likewise, attempted to increase pleasantness and intake of foods for elders by increasing sucrose concentrations in breakfast items in a trial published in 1996 (5). The preferred concentration of sucrose in these foods was determined initially in our laboratory. We were unfortunately not able to reproduce the results that were found by Schiffman. No increase in pleasantness occurred, whereas the increase in energy intake was attributable to the increase of sucrose concentration. One of the explanations may be that results obtained from lab studies do not necessarily predict behavior in the free-living situation. From this point of view, it can be argued that more research should be done in elders’ actual living situations, and “taste-and-spit” methods should be left to the laboratory.

Perhaps, as has been hypothesized by Schiffman, different types of chemosensory losses provoke different effects on food intake. In this light the results of Duffy and colleagues (6), that olfactory dysfunction correlates with a higher intake of fats and sweets, should be interpreted. The increased preference for sweeter, saltier, and fatter foods may indeed interfere with the current diet recommendations for elderly people and may influence the occurrence of chronic diseases. The intake of high-fat foods, together with reduced physical activity and disuse of muscles, may induce adverse changes in body composition. On the other hand, in the very old in contrast to the younger old, a further decline in activity pattern and energy expenditure may consequently hamper appetite and total dietary intake. This, in turn, may cause (micro)nutrient deficiencies. It is assumed that this can happen not only to ill patients but also to a group of elders who may be referred to as “frail” or “at risk.”

Another important issue in the field of chemosensory losses, appetite, and food intake in elders, which has been raised by Schiffman, is the focus on altered protein intake. Protein needs in older people are still a topic of debate. Recently, it has been suggested that dietary protein affects calcium homeostasis, through altered glomerular filtration rate and renal calcium re-absorption. High-protein diets may be associated with increased bone resorption and bone fractures; however, controversy exists (7). The potential for decreased renal functioning (8) is a problem that holds back the increase of protein recommendations for elders, but again there is a lack of data supporting this theory.

Chemosensory losses may affect food choices and, along with the aging process, may influence immune functioning and rates of gastric emptying. This latter problem may lead to a reduction in the desire to eat. Comments of de Castro (9) i.e., “the ability of ingested nutrients in the aging individual to affect the subjective state of hunger may be decreased,” are in agreement with this hypothesis. Perhaps of even more importance to take into account is the level of physical activity. An increased activity pattern may positively influence the efficiency of the whole internal metabolic process, and also appetite and food choice.
In general, sensory perception is assumed to be irreversible in most cases and therefore cumulative. Abnormalities in the nerves and head injuries are among other factors related to the aging process. Given the increased frequency of falls with age, traumatically induced sensory losses should be further investigated and, if possible, prevented (10). Increasing the activity pattern through exercises on balance and coordination may have a twofold effect in this case.

In summary, most of the issues raised by Schiffman are related to the question of whether certain types of chemosensory losses affect (a) food choices and, hence, (b) specific parameters of nutritional and health status or occurrence of certain types of chronic diseases. Still, a lot of controversy exists with respect to the effects of declined sensory perception. From our data we did not find evidence that food choices and dietary quality were affected by poor taste and smell perception. Unfortunately, we were not able to investigate thoroughly the impact of different types of chemosensory dysfunctioning on intake and nutritional and health status, nor the prevalence of chronic diseases like diabetes, osteoporosis, or coronary heart diseases in poor sensory performers. However, the influence on appetite, food enjoyment, and hence the quality of life was assured. Elderly people with chemosensory disorders may be distressed by a variety of social and psychosocial consequences of their disorder (10). This should not be trivialized and is an important subject for future research.

REFERENCES