

Editorial

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Abstract This special section of Genes and Nutrition presents a baseline analysis of ethical and legal issues undertaken within the EU FP7 research project Food4Me, which investigates the feasibility today of the vision for delivering personalized nutrition. Four major topics are addressed: Do we know enough for offering personalized nutritional advice? How can personal, cultural, and scientific perspectives on food and health be integrated? How does personalized nutrition affect individual autonomy? Which urgent ethical and legal matters stand out when personalized nutrition is commercialized?

Keywords Personalized nutrition · Ethics · Values · Dilemmas · Legal issues · Food4Me

Ever since the sequencing of the human genome and the early days of nutritional genomics research, great expectations have been upheld for a revolution in health care by means of personalized medicine and the closely connected idea of personalized nutrition. However, the prospect of personalized nutrition has also met with a number of difficulties, among else whether current knowledge gives enough basis for offering tailor-made individual advice based upon genetic information, difficulties in finding a business model to sustain its delivery, and ethical concerns.

In order to investigate such questions, the EU FP7 research project “*Personalised nutrition: an integrated analysis of opportunities and challenges*,” known as Food4Me, started in 2011. The aim of this project is to investigate the feasibility today of the vision for delivering personalized nutrition. Food4Me challenges the concept that personalized nutrition has to be rooted in genetic responsiveness to diet and includes a Proof of Principle intervention study, which exploits dietary and phenotypic, as well as genotypic data in the delivery of personalized nutrition via a web-based system. Food4Me also investigates consumer attitudes and analyses the opportunities and challenges to the establishment of suitable business models for the delivery of personalized nutrition, in collaboration with different stakeholders.

An important part of the work in Food4Me is the investigation of, and dialog on, relevant ethical and legal questions. What ethical and legal opportunities and challenges associated with personalized nutrition may be identified with regard to the knowledge so far available? How does personalized nutrition relate to ethical values, concepts of health, and cultural perspectives on food? What kind of delivery and business models are ethically and legally to be favoured?

A first important point is to define what the word “Ethics” signifies, as this term can be somehow unfamiliar to the readers of Genes and Nutrition. Ethics is the analysis of normative dimensions of human relations and experiences. Such analyses are often based upon basic (“intrinsic”) values derived from normative ethical theories. The aim of ethics is to discuss arguments and suggest solutions to relational situations, real or imagined, and not least to suggest solutions to complex dilemmas.

Personalization of nutrition creates ethical dilemmas. For instance, it is not easy to decide whether the value of

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receiving specific genetic information and related nutritional advice outweighs the possible negative effects of learning to know that one is at a higher than average risk for a non-treatable disease. In addition, it may be difficult to foresee, and so to respond appropriately to, the reactions from vulnerable persons to health-related information based upon such genetic tests. (See the discussion on *APOE* in Görman et al. 2013).

Also, it is not easy to determine the relative value of individual freedom of health control, compared with the interest of society with respect to initiating incentives at the population level to encourage responsible nutritional habits, or to introduce sanctions for unhealthy nutritional habits. (See the discussion on the *dilemma of individualization* in Nordström et al. 2013b).

The four articles in this Special Issue of Genes and Nutrition are the result of a baseline analysis undertaken within Food4Me on the ethical aspects of the concept of personalized nutrition. They emerge from a workshop arranged in Lund, Sweden, in October 2011, on ethical and legal aspects of personalizing nutrition. The aim of this two-day workshop was to offer a broad mapping and elucidation of the ethical and legal discussion of personalized nutrition at the start of the Food4Me project. The aim of the workshop was to update and collate current understanding of the ethical and legal aspects of personalized nutrition and to identify and discuss key ethical and legal issues connected to personalized nutrition.

Many earlier studies on the ethics of personalized nutrition have offered general reviews of the questions to be addressed when planning and implementing tailor-made nutritional advice based upon genetic testing. (See for instance Görman 2006; Castle et al. 2007; Bergmann et al. 2008; Korthals 2008). During the work resulting in this special contribution, we have looked deeper into four selected areas of ethical relevance for the concept of personalized nutrition.

The opening article, “Do we know enough?...,” aims at shedding light on the current disagreement whether time is ready for offering personalized nutritional advice. The crucial question is whether the current knowledge base is sufficiently strong for taking an ethically responsible decision to offer personalized nutritional advice based upon gene–diet–health interaction. Some main arguments for two divergent positions are presented. On the one hand, the scientific evidence for personalized nutritional advice is limited, and motivation is not yet well understood. On the other hand, standard population-based dietary advice is partly derived from epidemiological observations and usually not proven by clinical trials. In a number of specific cases of gene–diet interaction, individuals may benefit

from following personalized rather than general dietary recommendations. How can we responsibly go forward in such a situation characterized by limited knowledge and disagreement? (Görman et al. 2013).

The next article, “Food and health...,” starts by discussing what we mean by “food” and “health.” Food is not only nutrition, but it is connected to social contexts, cultural values, and identities. Likewise, health is not necessarily a descriptive concept; it may be seen as instrumental in relation to individual life plans—a perspective that turns health into a more complex, value-laden concept. The ethical challenge is then how to integrate individual, cultural, and scientific perspectives of food as well as health (Nordström et al. 2013a).

The discussion in “Values at stake...” brings up the question whether personalized nutrition strengthens or weakens individual autonomy. The individualization of health promotion may be accompanied by an extended attribution of individual responsibility for health. This constitutes the dilemma of individualization, caused by a conflict between the right to individual freedom and societal interests. Also, owing to the complexity of information with regard to food, a certain amount of trust is necessary. In general, the trust is essential for the food and health sector. All the more, this applies to personalized nutrition, as the consumer has no possibility to entirely verify the scientific basis for personalized nutrition offerings. On the other hand, personalized nutrition can provide tools to make autonomous decision on how to deal with health risks, and consequently reduce the need of trust. Trust requires trustworthiness, which cannot be enforced, but must be deserved (Nordström et al. 2013b).

Finally, “Consumers on the Internet...” discusses some of the ethical conflicts associated with commercialization of personalized nutrition. Consumers often have a positive attitude toward the option of receiving personalized nutritional advice based upon genetic testing. The prospect of enhancing or maintaining one’s own health can be perceived as empowering. However, current direct-to-consumer offerings over the Internet suffer from a questionable level of truthfulness and consumer protection, as well as a tension between far-reaching promises and contrasting disclaimers. From an ethical point of view, consumer protection is crucial, and caution must be taken when putting nutrigenomic-based tests and advice services on the market. This involves the question of legal regulations. Current Internet offerings appear to reveal a need to further guarantee legal certainty by ensuring privacy, consumer protection, and safety (Ahlgren et al. 2013).

Conflict of interest None.

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