

## Interview with Dr. Suzan Wopereis, TNO (The Netherlands)



### 1 - How did you start your research in phenotypic flexibility?

When I started to work as a junior scientist at TNO > 11 yrs ago, the first human study that was being conducted and I was involved in focused on the response to an OGTT as a measure of health (which was published in: PLoS One. 2009;4(2):e4525). I found this really interesting and also saw the strength / power of using a challenge test and focusing on 'the ability to adapt' as a measure of health. I decided that my research theme would be on 'what is health, how to quantify health and how to quantify effects from food, nutrition and lifestyle on health'. My team started our research focusing on personalized nutrition with the EU project 'Food4Me' in 2011, where TNO was one of the partners. The research on personalized nutrition that I will talk about also involves phenotypic flexibility as a measure of health.

### 2 - In your opinion, what is the most exciting result that you obtained in this subject?

Actually, there are two results that I am very excited about related to phenotypic flexibility. Recently, we did a proof of concept study using our developed standardized challenge test with our biomarker toolbox, where we quantified responses of >100 markers from optimal healthy to full blown disease (type 2 diabetes), which involved more than 10 years of research and we could confirm that using phenotypic flexibility was more sensitive in detecting health effects from food and nutrition, in this case from whole grain wheat, as compared to traditional measures, and that we were able to interpret the results as being beneficial as a result of this biomarker toolbox. The second result that I am very excited about is that this (adapted) version of standardized challenge test and biomarker response knowledge is now being used in the testkit developed by the personalised nutrition company called 'Habit' (see also <https://habit.com/home2>) and that our research resulted in a 'real product' that hopefully helps consumer to get a better knowledge on their health and how they can optimize their health by food.

### 3 - In your recent publications you employed dietary challenges (high-fat meals) to study metabolism. Why is this test so important and what can we learn from it?

These standardized dietary challenges can help in the scientific substantiation of health effects from food and nutrition. Interestingly, this is also acknowledged by the EFSA, since their scientific committee proposes "increased resilience to a challenge" as a beneficial effect based on our input on a public consultation on guidance for the identification of biological relevance of adverse/positive health effects from experimental animal and human studies! This opens avenues for food companies. Furthermore, 'phenotypic flexibility' can also be very helpful for example for sophisticated diagnosis of type-2 diabetic patients. We discovered in

collaboration with the colleagues from the Cordioprev cohort that subtypes in this patient population exist and that these subtypes respond differently to the two diets that were being provided to these patients, showing that tailoring or personalizing diets may be the future for treatment of type 2 diabetes (Diabetologia. 2015 Oct 16). And furthermore, I see a lot of opportunities especially in prevention of disease focusing on personalized nutrition!

**4 - What will be, in your opinion, the next developments in your area of research?**

I see a lot of interest and developments in the area of personalized nutrition. Wearables are being developed that focus on continuous monitoring. I can imagine that in the nearby future we will have continuous monitoring devices available focusing on multiple parameters that can quantify real time phenotypic flexibility without the burden of consuming a challenge test. Furthermore, I really hope that part of this research will be implemented in health care. In the Netherlands we are working on a program called lifestyle as medicine, where we collaborate with different partners in the Dutch health care system to evaluate how we can improve diagnosis in order to improve or even cure type 2 diabetes with lifestyle as treatment. Very exiting research!

**5 - What should people expect from your talk in the ECN webinar series that will happen on the 24<sup>th</sup> of October?**

I will discuss and show results from >10 years of research focusing on phenotypic flexibility. I will show the audience our exciting results on the proof of concept study focusing on whole grain wheat and also show how we approach the field of personalized nutrition. If time is still available I would also like to discuss some steps that we are currently taking into the Dutch healthcare around lifestyle as medicine focusing on type-2 diabetes. I am looking forward to the webinar!