# 23andMe Dinner

## **You Are What You Eat** but you can also
## **Eat What You Are**

## Gastronomy meets Nutrigenomics
### Dinner dedicated to Vertumnus
### May 20, 2011
### Brmlab, Prague

Thank you for sharing your DNA data with our chef and taking part in the first ever personalized DNA dinner for people with 23andme profiles. We will enjoy food, interact over available information on genes and play with a near future scenario on dinning in the age of personalized genomics.

*What happens when DNA decides on your menu?*
*How will restaurants use DNA data?*
*How will people connect and interact over such data?*
*How will this affect our experience of dinning?*

# MENU

## STARTER

## *Ancestry Map: DNA tour in time & space*

Your plate is an ancestry map where genes and food meet & create your genealogical portrait. Mom's cooking acquires special meaning with this starter that uses food to represents your genetic & culinary inheritance and the closest region where your DNA mixes and creates your unique individuality.

## Grilled Mushrooms with Hummus, Tomato, Olives, & Pecorino Cheese

*Denisa, on your plate the tomato, pecorino and olives from Tuscany which is the closest match to 70% of your genome meets Ashkenazim and East European stuffed mushrooms. The small portion of hummus on the side is a celebration of your 6 chromosome and its Mideastern mix. This chromosome hosts about 100 genes that are part of the Major Histocompatibility Complex defining our immune system but also olfactory receptors important in the experience of taste and sexual attraction.*

## Bacon stuffed Mushrooms & Cream Spread

*Pavel, Europe with all its diversity meets on your plate which celebrates your maternal T haplogroup (Tara) associated with the introduction of farming to Europe and the post-Ice Age migrants. They were probably part of the first milk drinkers that lived in the territory of present-day Austria, Hungary and Slovakia. As a result of a genetic mutation on chromosome 2 they were able to drink fresh milk in large quantities and digest lactose without experiencing intestinal problems. This miracle food made possible their population to grow and spread to the rest of Europe. Your starter is in honour of this haplogroup and early agricultural civilization with ability to produce diary & meat products like cheese and bacon.*

# MAIN COURSE

## *ADRA2A, MTHFR & TAS2R38 variations*

The main course will test and play with various SNPs that define eating together as a celebration of genetic diversity and interaction. Meals teach us to respect diversity in terms of type but also amount of food we have on our plates while still preserving the idea of eating together and sharing food. Meals will be served in portions of different sizes depending on the individual sugar intake efficiency status (ADRA2A gene) with the right balance of green veggies like spinach balance the individual needs for folates (MTHFR gene). We will also check the 8q24 region, SMAD7, LOC120376 and 15q13.3 regions which relate to meat consumption. The green, leafy and healthy veggies also test our PROP status (TAS2R38 gene), ability to detect taste and various bitter combinations which lead to taste curiosity. The first gastronomers where people with elevated PROP status and sensitive bitter receptors foraging and testing the surrounding flora.

## Lamb with Spinach & Potatoes

Lamb for the main course is a good and healthy source of vitamin B12 and B3 and has less saturated fat supporting the balanced function of both ADRA2A and MTHFR genes. You both have typical odds of hypertriglyceridemia which means that after eating, your body converts excess calories into triglycerides and stores them in fat cells without excess. This reduces your risk of diabetes 2 and other metabolic problems. We included potatoes as a side dish based on your ADRA2A gene also shows a good sugar metabolism and low risk of diabetes.

*Pavel, you will get fewer potatoes than in an average portion because your FTO gene regulating fatty tissue & BMI and the MC4R gene show slightly higher risk of developing obesity between the ages of 13 and 59. You will also get more spinach as a side dish because of your risky TT variant on the rs1801133 SNP related to MTHFR gene regulation of folates. This SNP variant elevates the risk of homocystein by 11% which increase the risk of cardiovascular and neurological diseases but also gastric and lung cancer. The homozygous rs1801133(T;T) individuals like you (10% of the population) have only 30% of the expected MTHFR enzyme activity related to folates when compared with the most common genotype, (C;C). Folates play an important role in the complete development of red blood cells which carry oxygen around the body. They help maintain healthy circulation of the blood throughout the body by preventing build-up of homocysteine. You have a trouble using folic acid to detoxify homocysteine which leads to free radical stress, vascular plaque formation and abnormal clotting. Preliminary research also suggests that high homocysteine levels can lead to the deterioration of dopamine-producing brain cells affecting the neurological health like development of Parkinson's disease. Folate status is also critical for normalizing antibody production and detoxifying the histamine the body produces as part of allergic reactions. It regulates all the detox enzymes that determine how well you clear toxins like heavy metals. That is why diet high on folates plays a crucial role on your plate.*

*Your TAS2R38 gene shows that you belong to the 25% of people unable to taste a chemical called propylthiouracil (PROP) similar to the bitter components found in cabbage, raw broccoli, coffee, tonic water, and dark beers.*

*Denisa, you have typical odds to develop obesity, however your FTO gene does contain the risky allele and for prevention we will give you fewer potatoes. You will get slightly more spinach as a side dish from average because of your CT variant on the rs1801133 SNP related to MTHFR gene regulation of folates. The heterozygotes and rs1801133(C;T) have only 65% MTHFR enzyme activity compared to the most common genotype, rs1801133(C;C). Folates play an important role in the complete development of red blood cells which carry oxygen around the body. They help maintain healthy circulation of the blood throughout the body by preventing build-up of homocysteine. You have a trouble using folic acid to detoxify homocysteine which leads to free radical stress, vascular plaque formation and abnormal clotting. Preliminary research also suggests that high homocysteine levels can lead to the deterioration of dopamine-producing brain cells that affects our neurological health like development of Parkinson's disease which you have an increase risk because of the GBA variant corresponding to the N370S mutation. This mutation in your GBA gene also causes a rare, recessive genetic condition called Gaucher's disease that you are carrier of. Folate status is critical for normalizing antibody production and detoxifying histamine the body produces as part of allergic reactions. It also regulates all the detox enzymes that determine how well you clear toxins like heavy metals. That is why diet high on folates plays a crucial role on your plate. Your TAS2R38 gene shows that you are able to taste a chemical called propylthiouracil (PROP) similar to the bitter components found in cabbage, raw broccoli, coffee, tonic water, and dark beers. This can make you a picky eater.*

## DRINKS

Your opioid receptor gene (OPRM1) will decide on how much drinks we will serve you.
The final cup of green or black tee based on your COMT gene will reveal some behavioural issues and secrets.

*Denisa and Pavel, your opioid receptor gene OPRM1 entitles you to only one and a half glass of wine. Having two copies of the A version at the SNP rs1799971 increases your odds of severe alcoholism 2.16 times because you have more than 12 years of education. We can serve you that extra half of a glass because your education was more than 12 years. The odds of severe alcoholism are 3.3 times higher for individuals with two A copies of the OPRM1 SNP rs1799971 when combined with less than 12 years of education. Unfortunately however, you have two AA copies of a variant in the DRD2 gene affecting the neurotransmitter dopamine receptors and increasing the risk of severe alcoholism 1.85 times. To add some words of comfort, this configuration of your OPRM1 SNP decreases sensitivity to social rejection so you will not suffer when people criticise you that you are drinking less and you will not feel being a burden to others. People with two A copies of the OPRM1 SNP rs1799971 have significantly lower levels of sensitivity to social rejection and even pain. Your lower brain activity in the anterior cingulate cortex and the anterior insula, brain regions associated with the processing of both physical and emotional pain, make you more resilient than the people with one or two Gs.*

*Denisa, you will get a cup of green tea at the end because your COMT's rs4680 marker (A;A - Met/Met variant) which lowers your odds of breast cancer while Pavel's GG (Val/Val) variant has no effect on deactivating the tea polyphenols. Women with at least one of the low activity COMT allele "A" who drank black or green tea had about half the odds of breast cancer compared to those who didn't. Tea contains polyphenol compounds, particularly catechins, which are antioxidents and whose biological activities may be relevant to cancer prevention. The rs4680 SNP also defines how dopamine is metabolized which relates to various cognitive functions. The "Met/Met" individuals like Denisa are more exploratory and have advantage in pondering while "Val/Val" individuals like Pavel have the advantage in the action selecting. Roughly speaking, the predominant wisdom (warrior/worrier hypothesis) posits that people with Val alleles like Pavel have increased COMT activity and lower prefrontal extracellular dopamine compared with those with the Met substitution like Denisa. Denisa's version of the SNP boost working memory and cognitive function compared to Pavel's version but it also hampers emotional control. G version (Pavel's) may be associated with an advantage in the processing of aversive stimuli (warrior strategy), while Met158 alleles (Denisa's A version) may be associated with an advantage in memory and attention tasks (worrier strategy). Under conditions of increased dopamine release (eg, stress), Pavel may have improved dopaminergic transmission and better performance, while individuals like Denisa may have less efficient neurotransmission and worse performance.*

*Some evidence suggests that Val158 alleles (Pavel's G;G genotype) are associated with schizophrenia, while Met158 alleles (Denisa's AA genotype) are associated with anxiety. The G;G genotype also increases risk of schizophrenia triggered by cannabis. While Pavel as rs4680(G;G) carrier responds well when deprived of sleep to modafinil in terms of improved vigor and well-being, and maintained baseline performance with respect to executive functioning, Denisa as rs4680(A;A) individual barely responded to the drug at all.*