Predicting Personal Nutrition Recommendations

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The current problem is too generic nutrition recommendations

Currently the recommendations are given for very wide groups and thus can be too loose or too restrictive for the individuals

VRN 2017 - Kouluruokailusuositus - Koululaiset

Ravintoaine	Energiaprosentti	Alaraja
Energia, kcal		700 kca
Energia, kJ		3000 kJ
Hiilihydraatit	✔	45 %
Proteiini	✔	13 %
Rasva	✔	30 %
Suola		

VRN2014 women 31-60 years

Ravintoaine	Energiaprosentti	Alaraja	Yläraja
A-vitamiini RAE		700 µg	700 µg
B12-vitamiini		2 µg	2 µg
B6-vitamiini		1,2 mg	1,2 mg
C-vitamiini		75 mg	75 mg
D-vitamiini		10 µg	10 µg
Energia, kcal		2100 kcal	2100 kcal
Energia, kJ		8800 kJ	8800 kJ

.. but after we can predict the personal reactions to food then these recommendations can also be personalized

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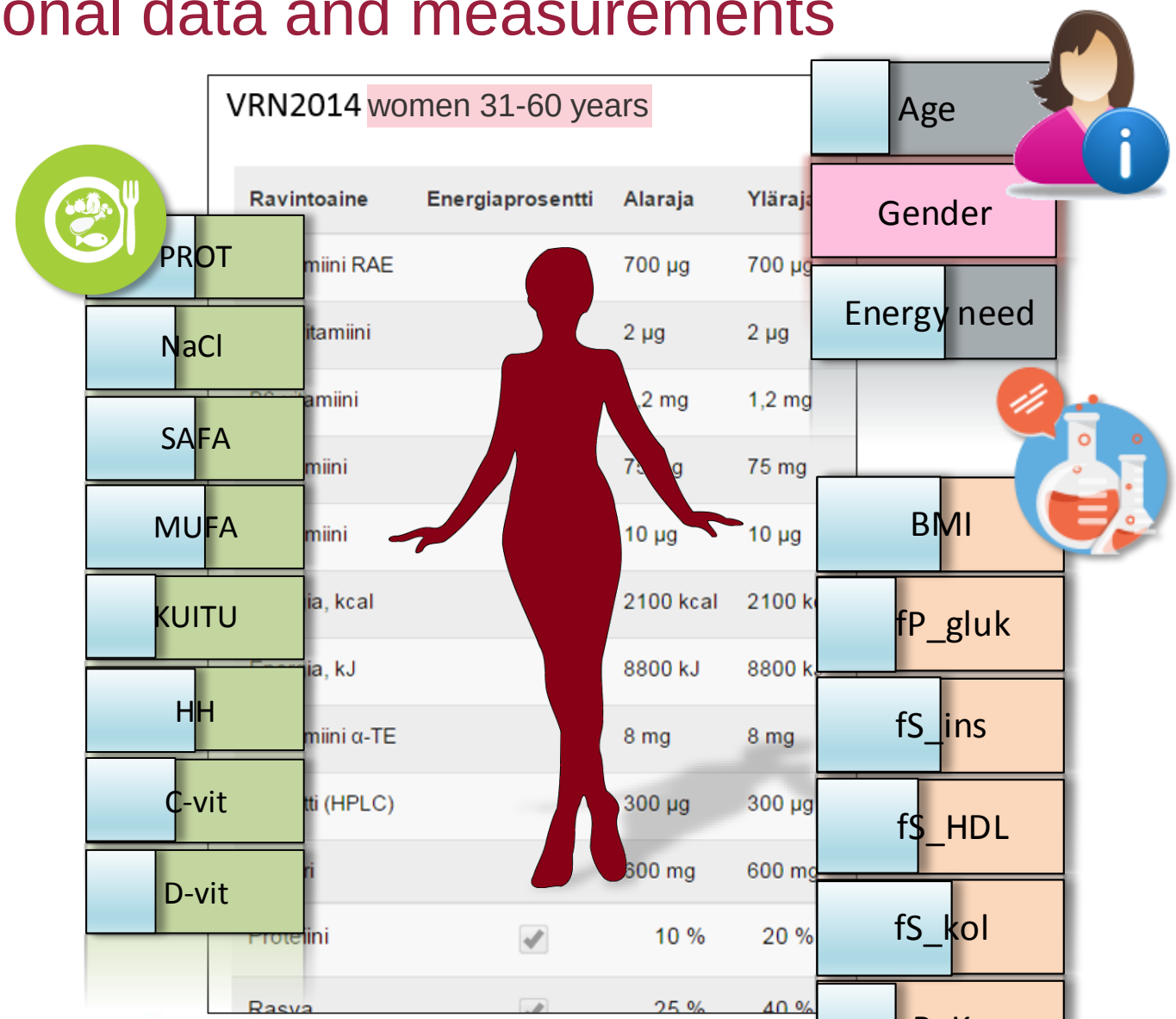
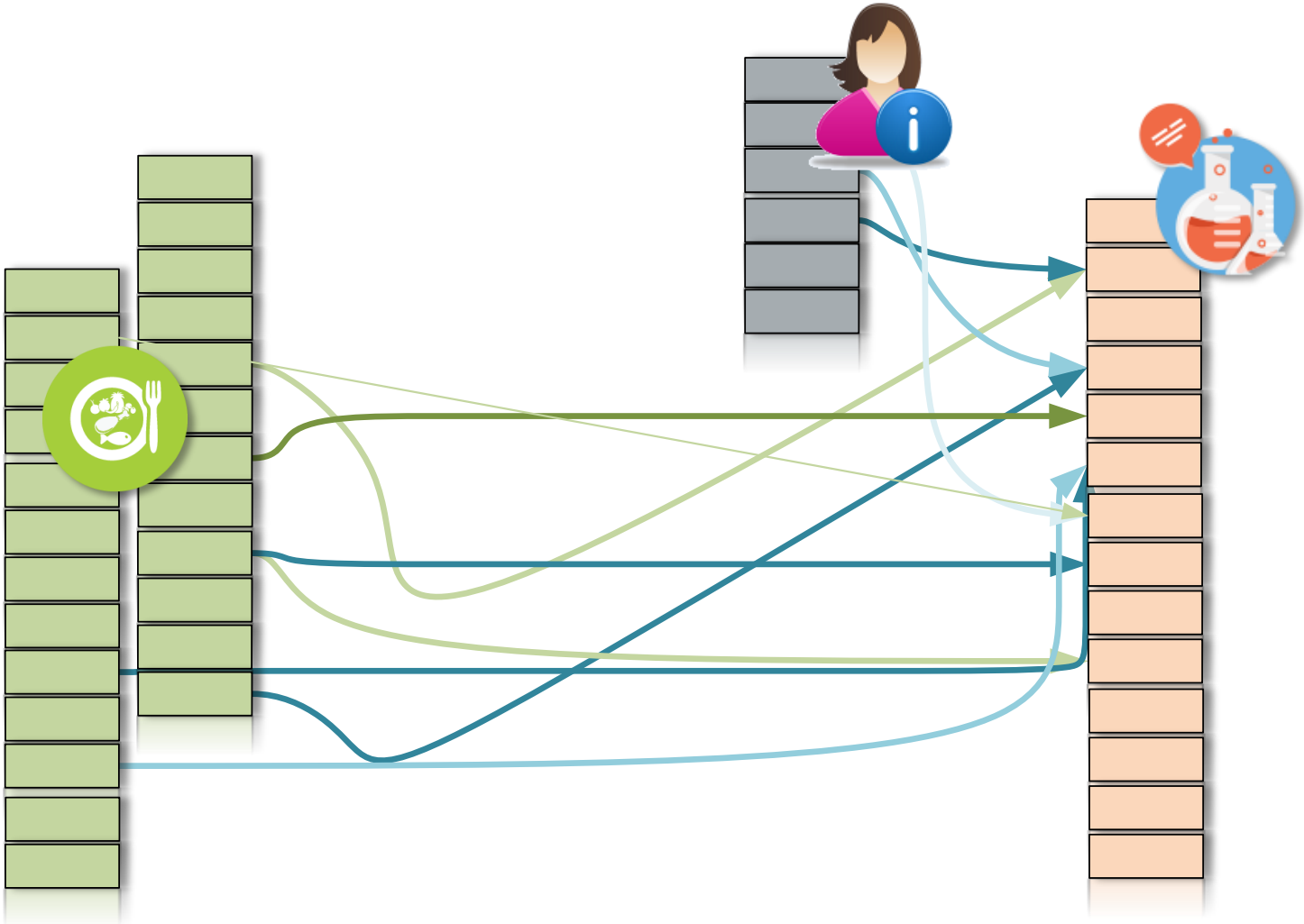
General recommendations are enriched with personal data and measurements

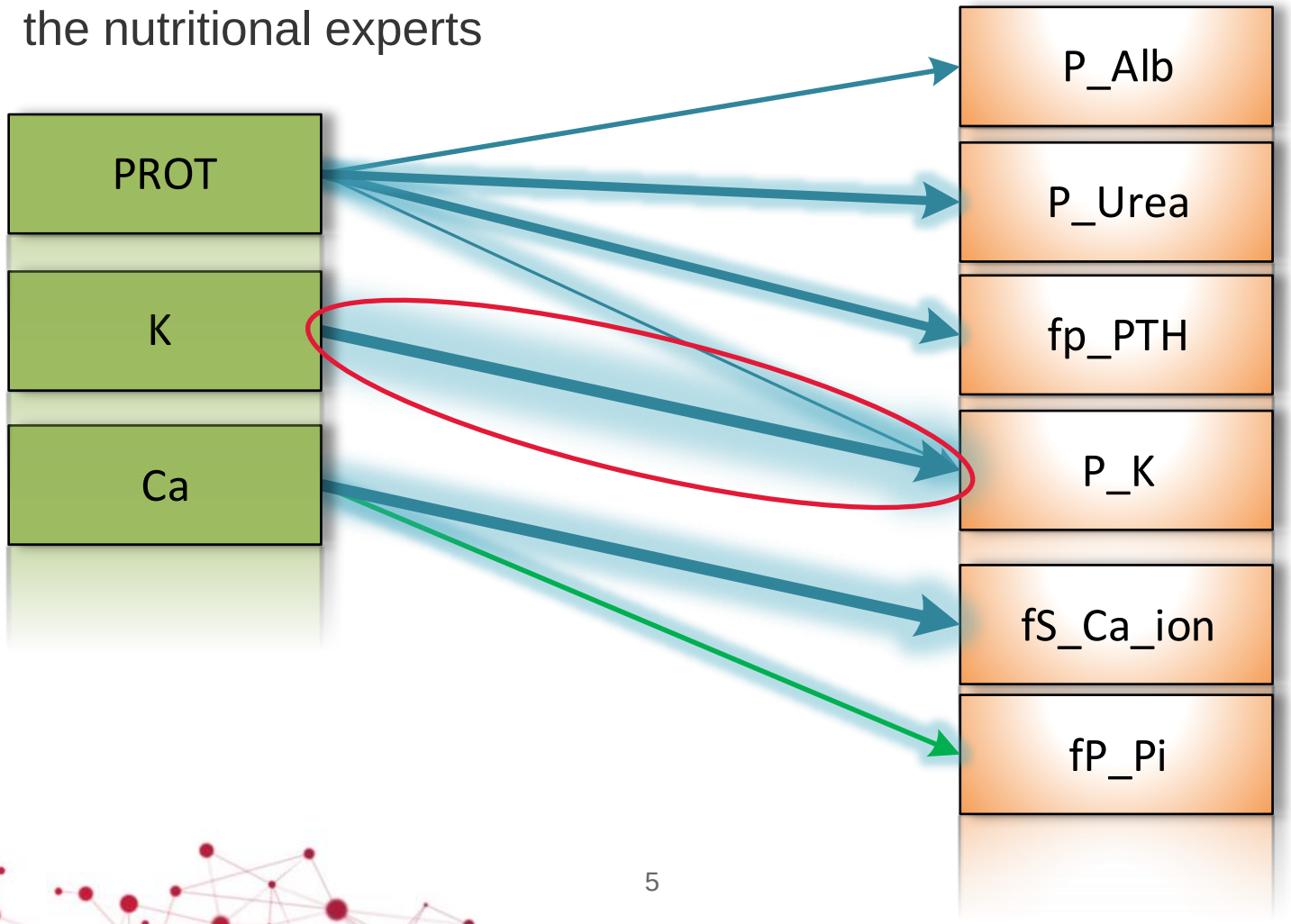


First, dependent variables are searched based on the data and the previous nutritional research

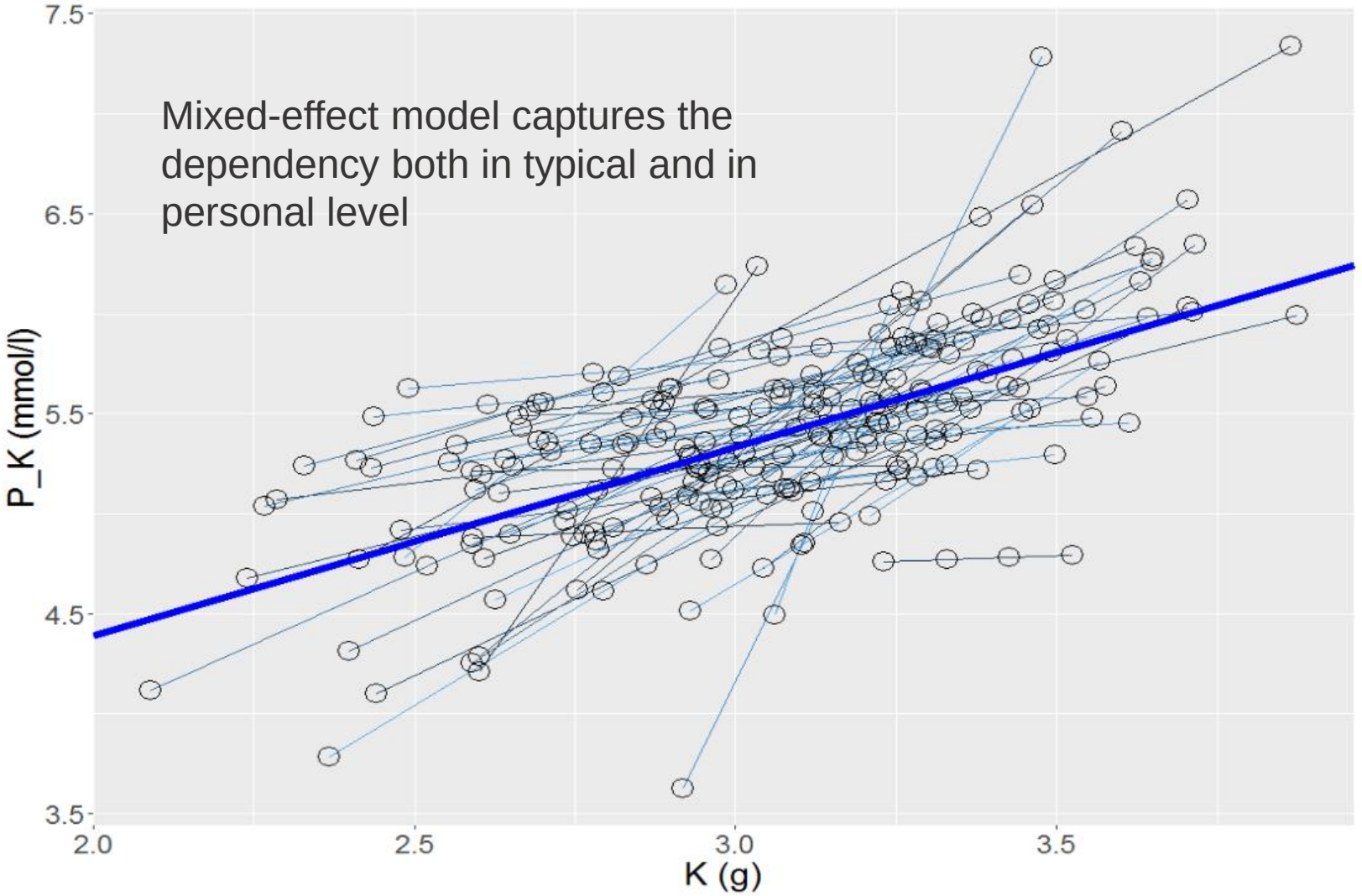


As a result a directed graph of dependent variables is formed

- Mixed-effect modeling is used to capture the local personal variances that are interesting to the nutritional experts



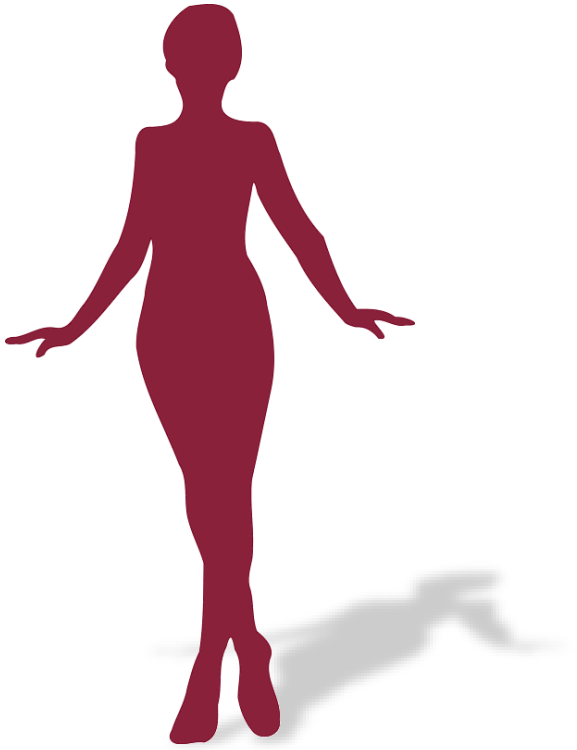
Let’s look closely one of these dependencies...



Calculating a prediction for a new patient

- The patient has a kidney malfunction and a very strict diet
- Let’s assume the therapist is given
  - Food diary of protein and kalium intake
  - Kalium measurements from the blood samples

PROT	K	P_K
42	4.65	3.11
58	5.32	5.32
75	6.11	9.65



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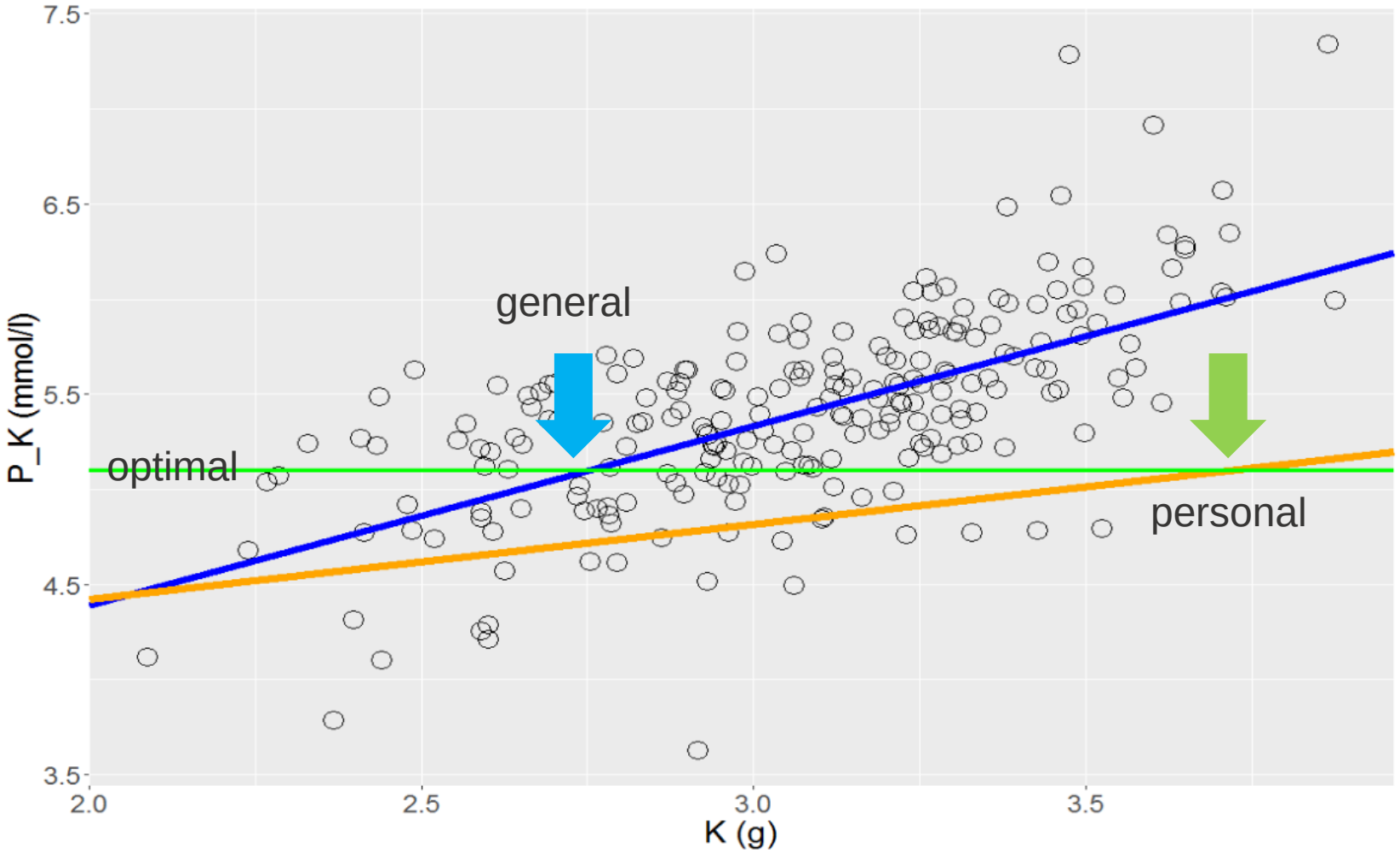
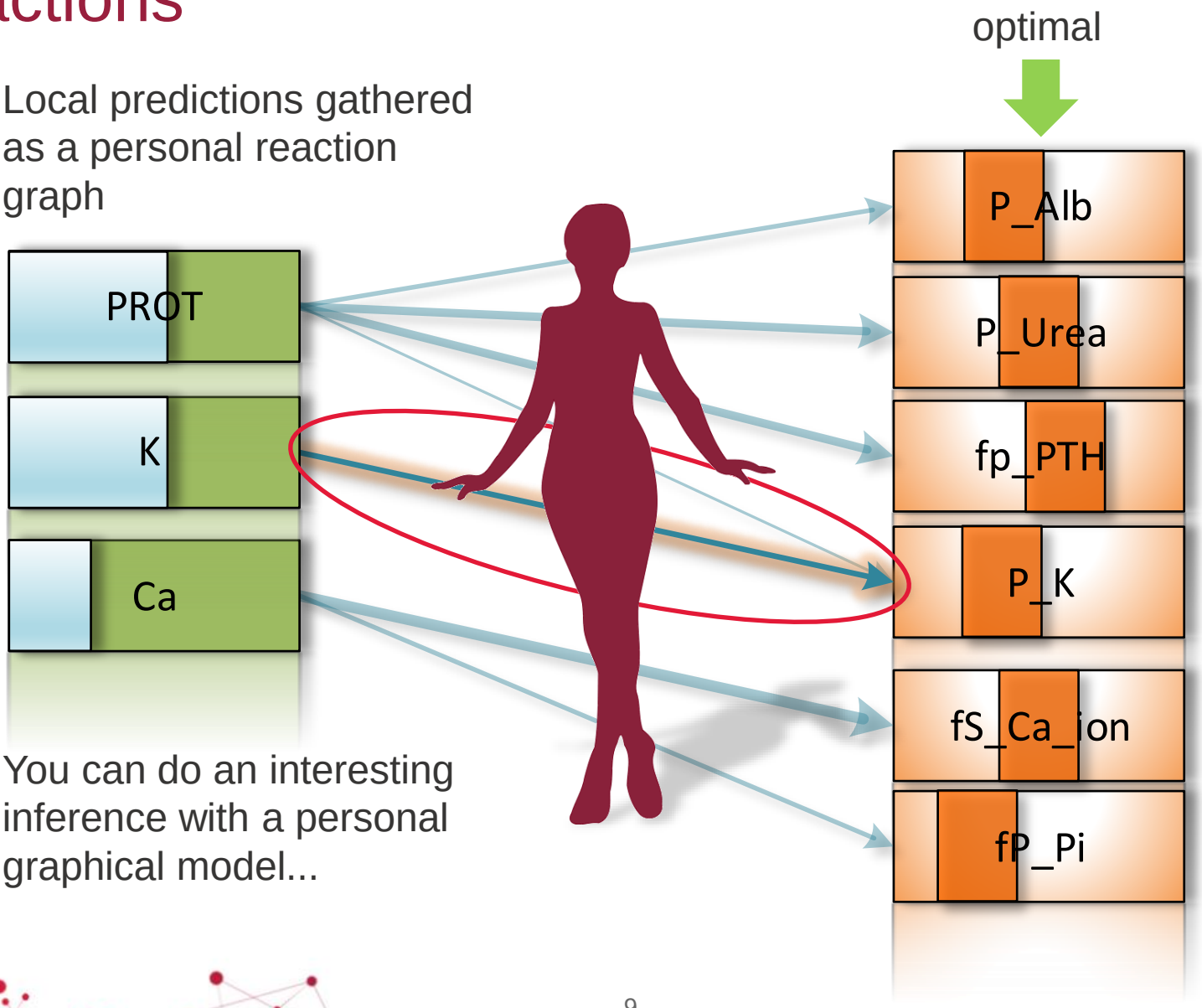
Personal prediction of the kalium response



Predicted personal graph of the nutritional reactions

Local predictions gathered as a personal reaction graph



You can do an interesting inference with a personal graphical model...

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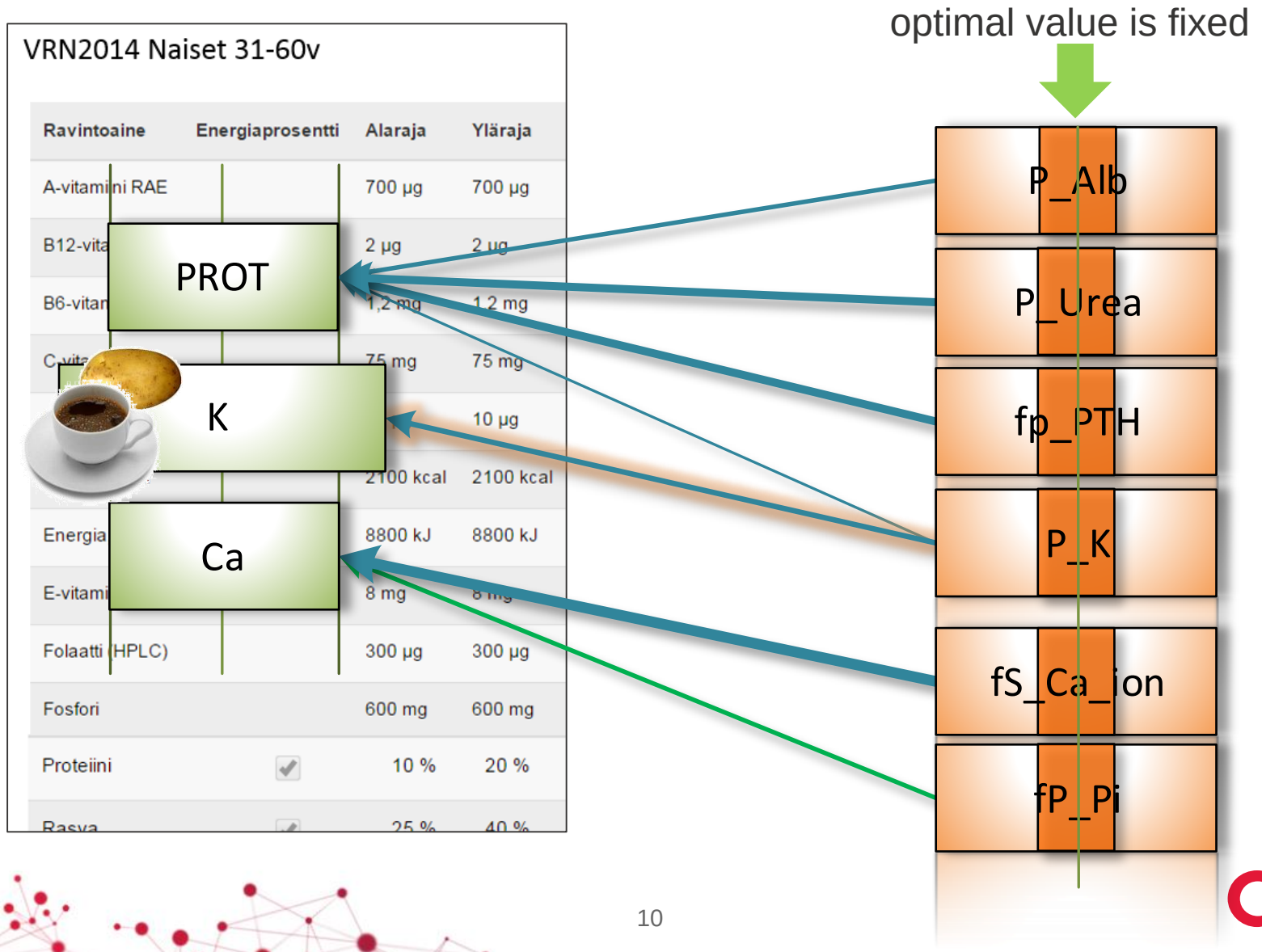
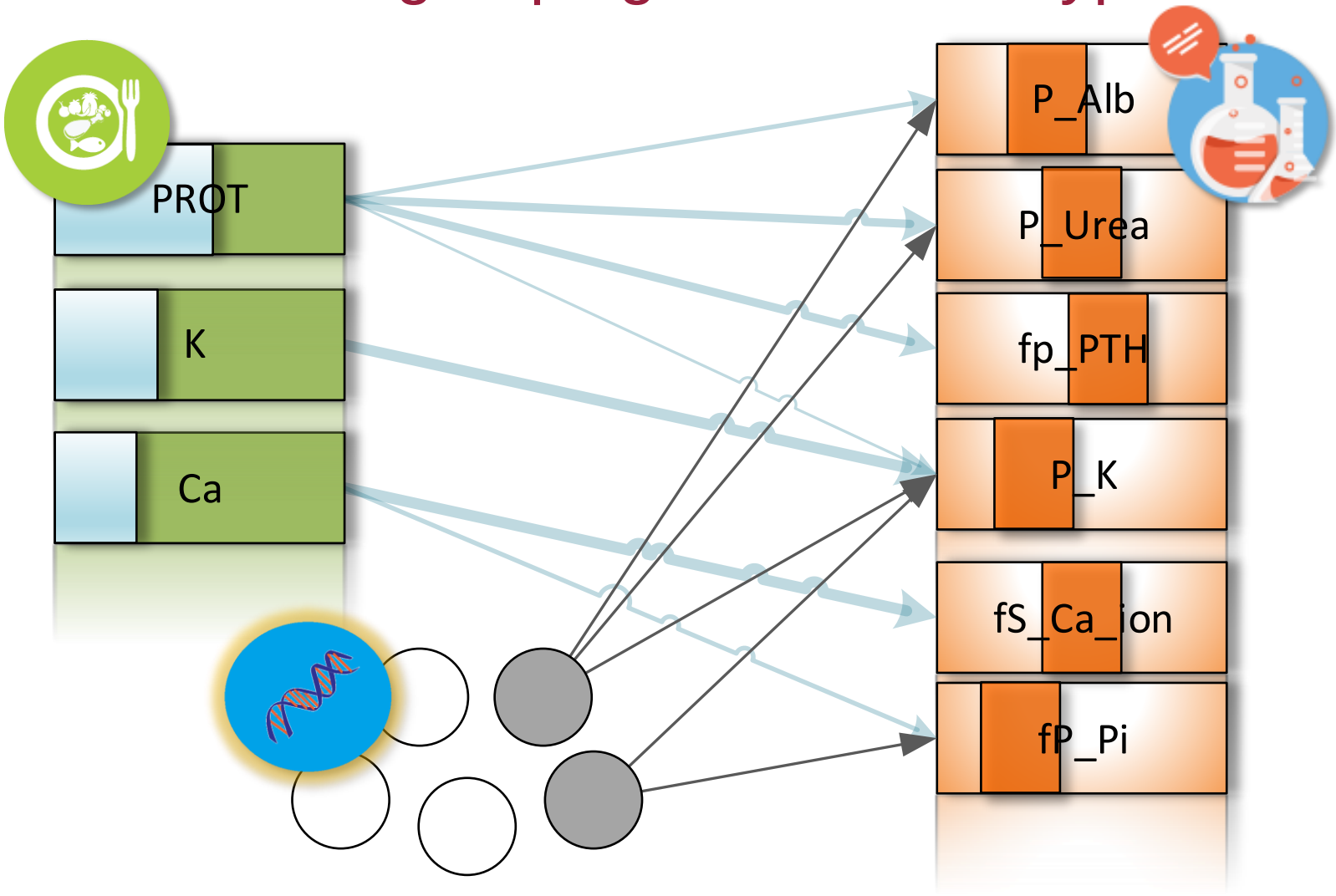
The graph calculates the personal recommendations when the direction of arrows is changed



Personal genes could be predicted with latent variables grouping the reaction types



Thank you!

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