Biomarker measurements in the aging cohorts of the FP7 project "CHANCES"

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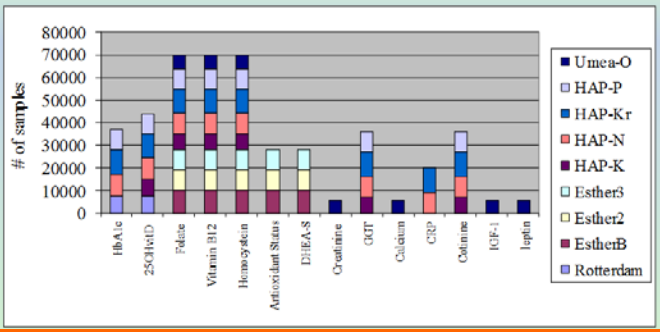
Introduction.

CHANCES (Consortium on Health and Ageing: Network of Cohorts in Europe and the United States) is a collaborative large-scale integrating project funded by the European Commission within the 7th Framework Program. The project is now 3 years on the way and will end in February 2015. The CHANCES project aims at combining and integrating on-going studies in order to produce evidence on ageing-related health characteristics and determinants in Europe. The CHANCES project focuses on four groups of chronic diseases and conditions which are major contributors to the burden of disease in the elderly: Cancer, Cardiovascular diseases and diabetes, Osteoporosis and fractures, Cognitive disorders.
http://www.chancesfp7.eu/

Biomarker inventory.

In an integrating work package on Biomarkers (WP9) an inventory has been made of the biomarkers that have already been measured in the various cohorts. For analysis we will focus on markers that are thought to be involved in more than one age-related chronic disease.



Biomarker measurements

It was decided to focus the measurements on five cohorts from Heidelberg, Krakow, Prague, Kaunas and Novosibirsk.
The following biomarkers will be measured in serum: ROM (hydroperoxides), BAP (antioxidant status), TTP (total thiols), 25OH-Vitamin D, creatinine, GGT, HS-CRP, folate, Vitamin B12, Na, K, Cl, Ca, Mg.

Table 1: Biomarkers measurements within WP 9 of CHANCES

Cohort	# samples	biomarkers	timeframe
ESTHER	3,130	ROM, BAP, TTP, Na, K, Ca, Mg	Jul-Sept 2012
HAPIEE Prague	2,500	25OHVitD, ROM, BAP, TTP, Na, K, Cl, Ca, Mg, Creatinine, CRP, GGT, Folate, VitB12	Nov-Jan 2013
HAPIEE Krakow	2,500	25OHVitD, ROM, BAP, TTP, Na, K, Ca, Cl, Mg, Creatinine, HS-CRP, GGT, Folate, VitB12	Mar-May 2013
HAPIEE Kaunas	2,500	25OHVitD, ROM, BAP, TTP, Na, K, Ca, Cl, Mg, Creatinine, HS-CRP, GGT, Folate, VitB12, uric acid	Jul-Aug 2013
HAPIEE Novosibirsk	2,500	25OHVitD, ROM, BAP, TTP, Na, K, Ca, Cl, Mg, Creatinine, HS-CRP, GGT, Folate, VitB12	Sept-Nov 2013
Various cohorts	80/cohort	25OHVitD	2011-2013

Vitamin D status

In In all WPs much interest was expressed for assessing the vitamin D status by measurement of 25OHVitD. Within WP9 the measurements are performed with an EIA from IDS or Diasource.
In other cohorts a variety of other methods were used. Therefore we have initiated a QC program for 25OH-Vitamin D in which from each cohort 80 samples will also be measured with LC-MS/MS by the same Laboratory.

Table 1 – Sex differences in baseline 25-hydroxyvitamin D (25(OH)D) levels before and after calibration with LC-MS/MS in the ESTHER study

			Uncalibrated		Calibrated	
25(OH)D assay	n	Sex	Mean 25(OH)D levels [nmol/L]	Proportion with 25(OH)D <30 nmol/L (%)	Mean 25(OH)D lls [nmol/L]	Proportion with 25(OH)D <30 nmol/L (%)
Diasorin-Liaison	5,386	Female	36.2	48.3	46.5	15.7
IDS-iSYS	4,199	Male	60.2	12.1	57.1	14.3

L Perna, U Haug, B Schöttker, H Müller, E Raum, E Jansen, H Brenner. Public health implications of calibrated 25(OH)D levels: a decrease in vitamin D deficiency among older women in Germany. Preventive Medicine, 55, 228–232, 2012.

B Schöttker, E Jansen, U Haug, L Perna, J Köhrle, L Schomburg, H Brenner. Calibration of misleading immunoassay based 25-OH vitamin D levels with LC tandem-mass spectrometry in a large cohort study. PLoS ONE 7(11): e48774 (2012).

Conclusions

Within the FP7 project CHANCES a number of biomarkers will be measured in five selected cohorts, with emphasis on oxidative stress markers.
In addition a Quality Control program for 25OH-Vitamin D is ongoing using LC-MS/MS.