



PROJECT DELIVERABLE REPORT

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CONTENT

Datasets available for integration in ENPADASI	1
General description of the studies	1
Measurements.....	2
Biological samples and Laboratory measurements	2
Storage and Data sharing.....	3
Interventional studies and other experimental studies in ENPADASI	4
SUMMARY	4
StuDY templates	4
Data entry and sharing	5
Limits to DATA sharing.....	6
Conclusions.....	7
Further development and perspective	7
References	8
Table 1. Description of the observational studies participating in ENPADASI.....	9
Table 2. Dietary intake assessments conducted in the observational studies participating in ENPADASI.....	16
Table 3. Description of other measurements assessed in the observational studies participating in ENPADASI.....	17
Table 4. Measurements assessed in samples from the observational studies participating in ENPADASI	18
Table 5. Availability of observational studies to store and share data	19
Table 6. Availability of experimental studies with fully or partially shared data	22



DATASETS AVAILABLE FOR INTEGRATION IN ENPADASI

Deliverable 2.1.1 provides the list of datasets available regarding observational and intervention studies participating in ENPADASI. This second version of the deliverable was updated with respect to studies uploaded and shared through the dbnp databases, which contain mainly experimental datasets. This is a consequence of the active development of this system through ENPADASI so that more partners could share their experimental data. The section on observational studies has not been updated. observational studies participating in ENPADASI

We developed a template that was circulated to the Partners involved in WP2, the DEDIPAC consortium, and to the PIs of the studies enclosed in the grant proposal. In addition, we were open to invite and circulate the template to other PIs of observational studies upon request.

We followed several steps for the development of the template: The first step, conducted in January 2015, was to create the first version of the template based on the questionnaire used in DEDIPAC to gather survey data entitled "Full questionnaire on existing surveillance systems in DEDIPAC countries" [1]. The first version was circulated to all WP2 task leaders (Lars Ove Dragsted, Irina Dobre, Carl Lachat, Tobias Pischon, Giuditta Perrozzi, Marco Gobetti) for feedback and was further discussed in a Skype conference. The second step, conducted in February 2015, was to develop the second version after taking the WP2 task leaders' (listed above) suggestions into account. Version 2 was circulated again among WP2 task leaders, and further discussed in a Skype conference. In March 2015, the template was circulated to all WP2 partners and DEDIPAC partners who had indicated willingness to share data within ENPADASI (for feedback). In April 2015, the final version of the template was created after receiving feedback from all WP2 partners.

The final template was sent out to all WP2 partners and DEDIPAC partners willing to participate in ENPADASI, asking them to fill in the template with the required information of their studies to be shared in ENPADASI. In addition, the template was uploaded to the ENPADASI intranet. The completed template was returned via e-mail to Dr. Mariona Pinart who aggregated the templates in a final list of observational studies including study information for integration in ENPADASI.

GENERAL DESCRIPTION OF THE STUDIES

We identified 23 nutrition studies conducted in Italy (6), Germany (5), Belgium (4), Spain (3), Ireland (2), Estonia (2) and Denmark (1), recruiting adult subjects. In addition, six studies also recruited subjects aged < 18 years. The studies are mainly cross-sectional (10) or longitudinal (8 cohort studies). We also identified two case-control studies from Italy (NU-AGE, and CRA-Nu) and another three Italian studies that followed another design (INGI-FVG, INGI-CARL and SR). Of the 23 observational studies, eight are still ongoing or have recently started (DONALD study, Hamburg City Health Study and National Cohort, Germany; Diet, Cancer and Health study, Denmark; TUDA study, Ireland; CRA-Nut and Diet4MicroGut and INGI-FVG, Italy). Of the 23 observational studies, 13 recruited or will recruit thousands of subjects, only six studies recruited or will recruit less than 1,000



subjects (CRA-Nut, Italy has recruited 48 subjects, so far) and the rest recruited or will recruit over 10,000 subjects (National Cohort, Germany expects to recruit 200,000 subjects, the largest study participating in ENPADASI) (*see Table 1*).

MEASUREMENTS

All studies collected information on dietary intake. They mainly collected food intake in the form of 24-h dietary recall (11), food frequency questionnaire (FFQ) (14) and/or food records (9) in self-administered questionnaires (web/computer- or paper-based) or face-to-face interviews (*see Table 2*). Four studies (National Dietary Survey, Estonia; AIRC Project and Diet4MicroGut, Italy and METBANC, Spain) collected information on dietary intake using all three forms.

All of the studies collected information on alcohol, tobacco consumption and physical activity, although AIRC Project (Italy) has no data on tobacco consumption. Only nine studies have data on sedentary behavior (Food Consumption Survey 2004/2014 and NESCaV, Belgium; Baltic Nutrition and Health Survey 1997 and National Dietary Survey 2014, Estonia; BVS II, NVS II and DONALD study, Germany; National Adult Nutrition Survey, Ireland; and NU-AGE, Italy) (*see Table 3*).

All of the studies have data on socio-economic status (SES) (including sex, age, residence, country of birth, country of citizenship, marital status, income, education level among other variables) with the exception of METBANC from Spain. Furthermore, all of the studies have data on health status mainly on diseases such as cardiovascular disease but also on cancer, diabetes, respiratory disease, chronic infectious disease, and neurodegenerative disease, with the exception of a regional study from Belgium. Regarding anthropometric measurements, three Italian studies have not collected anthropometric data (INGI-FVG, INGI-CARL and SR) (*see Table 3*).

BIOLOGICAL SAMPLES AND LABORATORY MEASUREMENTS

The majority of the studies collected blood (serum, plasma), urine or saliva, and some also collected hair, toenail clippings, nasal swabs, stool, adipose tissue to measure biomarkers and omics (metabolomics, proteomics and/or genomics). Only 6 studies did not collect samples for measurements (A regional study from Liège (no acronym), Food Consumption Survey 2004/2014 and Health Interview Survey, Belgium; Baltic Nutrition and Health Survey 1997 and National Dietary Survey 2014, Estonia; NVS-II, Germany).

Four studies (Food Consumption Survey 2004/2014, Health Interview Survey, Belgium; Baltic Nutrition and Health Survey 1997, National Dietary Survey, Estonia; and NVS II, Germany) have no data on biomarkers, metabolomics, proteomics and genomics/transcriptomics. Lipids (mainly HDL, LDL, and cholesterol) were measured in 14 studies. These 14 studies have also data on glucose/insulin (glucose and insulin in serum, and HbA1c in EDTA plasma). Ten studies have data on inflammatory markers such as C-reactive protein (CRP), IL-6, TNF- α among others. Only seven studies have data on adipose markers such as adiponectin, leptin in either serum or plasma (*see Table 4*).



Regarding metabolomics (5 studies), NMR and MS are measured mainly in urine, although some studies measured them in blood (serum/plasma), saliva or feces. Only three studies measure proteomics (Diet4MicroGut, and NU-AGE, Italy; National Adult Nutrition Survey, Ireland). Those studies assessing genomics (14 studies), mainly measure candidate SNPs. In addition, four Italian studies include whole genome sequencing (AIRC Project, INGI-FVG, INGI-CARL, SR and Diet4MicroGut) (*see Table 4*).

STORAGE AND DATA SHARING

Most of the observational studies identified indicated that their study was approved by an Ethics Committee and informed consent was provided (the pertaining section was not filled in by one of the studies: Diet4MicroGut, Italy). The majority of the studies expressed an interest in storing and sharing data within the ENPADASI consortium, although some of them need confirmation or request an agreement form. Conversely, 9 studies are not keen on storing and sharing data within the consortium (Diet, Cancer and Health, BSVII, NVS II, DONALD, HCHS, TUDA, National Adult Nutrition Survey, NU-AGE, and AIRC project). In addition, with the exception of 5 studies (TUDA, National Adult Nutrition Survey, NU-AGE, and AIRC project), the studies expressed their will in storing and sharing data for specific research projects outside ENPADASI. Regarding metadata, all of the studies agreed to share metadata, although some of them need confirmation or require Board approval (*see Table 5*).



INTERVENTIONAL STUDIES AND OTHER EXPERIMENTAL STUDIES IN ENPADASI

SUMMARY

Summary: Since 2015 we have

- a) finalized the templates for entering experimental studies into the database
- b) Improved the methods for uploading large datasets such as metabolomics data
- c) entered several studies using either of these supports
- d) addressed several technical and legal issues that make sharing difficult

STUDY TEMPLATES

During Jan-Apr 2015 we had Skype meetings once or twice a month to make sure we could finalize at least one template for experimental studies. The first template (I) finalized in March was dedicated experimental studies (with human volunteers or with experimental animals) while the second template (II) finalized in April was made with an even more open structure to include both experimental and observational studies. Both templates are made in such a way that the study design as well as any data from the study can be entered into the database. A Guide and a number of pop-up explanations are included in the templates to support the users who want to use the templates to share their studies. The templates exist as Excel files and the original experimental template also exists in the form of an on-line form for data entry after log-in into the Data-Sharing Initiative (DASH-IN) data repository at <https://dashin.eu/interventionstudies/study>. The templates have been developed in such a way that they can be used directly for batch uploading of studies into the DASH-IN database.

From April 2015 until April 2017 a new interface to improve ease of data upload has been developed and tested. Using this interface we have been able to increase the number of studies available considerably. We have also produced a detailed manual of how to install the dbNP system and all these additional tools and manuals have been transferred to the ENPADASI home page and will be part of the final overall manual for the DASH-IN system.

The template was distributed to WP2 partners and to task leaders in WP3, 4 and 5. WP3 needs to know the template in order to program the interface making it possible to share and analyze data in a facile way linking to external sources. WP4 needs to use the wording from our template in order to shape the ontologies that we will develop and use for the system. WP5 needs the template in order to assess intellectual property right (IPR), ethical as well as certain quality control issues. Quality control issues are also part of WP2 tasks 2.2 and 2.3. Based on interactions with these WP's and tasks the templates and tools were amended to improve usefulness and integration between the various aspects of ENPADASI.



DATA ENTRY AND SHARING

The templates and the online system have been used to include more than 100 studies until now, and 98 of these are uploaded into the system of theTNO based server located in Amsterdam, Holland. Most of these are closed or ongoing and only 28 are open. On the Danish server located at the University Of Copenhagen (UCPH) there are uploaded 10 studies into the system 50% of the studies are still closed and 50% are open. Additional instances of dbNP are under establishment elsewhere in Europe including Bari, Italy, and a few studies may also be available there shortly.. The reason for keeping many studies closed is mainly the legal issues prohibiting data sharing of human studies as long as the volunteers can be identified, see section c below. Among the total of 33 partially open studies 4 are mouse studies and 29 are human studies and of these 24 are experimental (Table 6) and the remaining five are observational. The studies have been entered into templates I and II first or they have been uploaded directly. Studies from the Netherlands, Italy, Germany, France, Norway, Belgium and Denmark are among the partially open studies while it is not possible to see the origins of the closed studies. All mouse studies and one human cell culture study are focused on transcriptomics as the major endpoint to explore cell signaling and regulatory changes during high-fat diets.

Human dietary study designs. Among the open human studies 22 are experimental. Ten are short-term challenge tests or include challenges after intervention while 12 studies include dietary interventions for up to 6 weeks. Among the challenges, glucose challenges in the form of a formal OGTT test or test with a lower glucose load is the most common (four studies) but challenges with lipids (3 studies) proteins (one study) or with fasting for 12 or 36 hours (2 studies) are also in the databases. Some of the challenge studies include also complex food items (berries, apples, seaweed, proteins) while cold stress is the challenge in one study. Four of the challenge tests are performed in a full cross-over design, while one study with multiple challenges is a sequential study with each individual following the same sequence of challenges ('parallel n=1 design').

The intervention studies include fourteen dietary interventions and one drug intervention. The drug, one of the diets, and some probiotics are provided in the different studies as potential anti-inflammatory treatments. The other intervention studies include high/low lipids, high/low polyphenols, high/low glycaemic index, high/low wholegrain, vegetable fed vs. marine fed trout or equicaloric lipid loads with two dairy products (cheese and butter). One study compares age groups in a weight loss setting. Four studies are full or partial cross-over interventions while the others have parallel designs.

Human dietary study endpoints. Most of the human studies include common plasma clinical chemistry markers such as glucose, insulin, and cholesterol in lipoproteins and most include at least one profiling technique ('omics). Twelve of the studies, all except one of the challenge tests, include metabolomics; four with NMR and eight with LC-MS; three studies with more than one platform also include GC-MS metabolomics.



Four of the studies use proteomics and/or transcriptomics; two challenge studies and two interventions use proteomics while transcriptomics is used in one challenge test and in three interventions. Anthropometrics was included in all intervention studies and other physiological markers such as blood pressure or heart rate are measured in several studies.

LIMITS TO DATA SHARING

The major obstacles to sharing have been mapped and have been detailed in a separate deliverable from task 2.4. They may be divided into personal and technical issues. The technical issues are primarily related to legal limitations and to IT-infrastructure. The legal limitations are related only to human studies. The legislation differs between countries but in most EU-countries it is illegal to share information such as clinical or genetic data and any other health-related information as long as it is person-identifiable. It is also illegal to transfer such data to other countries unless a data manager contract is drawn up and accepted by the appropriate authorities or an extended informed consent is provided by the volunteers. If the data is anonymized, i.e. it is not in any way possible any more to identify the volunteers who donated data or samples then data could be free to share. However, procedures to anonymize data differ between countries. So, basically there are two possibilities for sharing data,

- i. Data are first fully anonymized, then shared on a central server such as the dbNP server at TNO in the Netherlands or at University of Copenhagen in Denmark
- ii. Data are only shared bi-laterally following acceptance of data manager contracts between two parties or based on informed consent of the sharing

A third possibility may be available where data reside on national servers in the country of origin and data analysis is performed there using remote commands allowing only statistical outputs (no person-identifiable data) to leave the servers.

It is imperative in any of these cases that a well-designed database system holds the data. Since the source code for the db-NP database is freely available it is possible to set up local databases that are structural mirror images of dbNP. We have managed to set up the system locally in Denmark and a manual for setting up national or partner institutional copies of DASH-IN has been finalized. This will partially overcome the problems in sharing and will allow all partners to fully upload their data locally and then provide open access as soon as the donors have been anonymized according to national legislations.

The consequence of these developments is that after ENPADASI users can continue the work with data upload although the work on legal and ethical obstacles may still need local attention in some countries. An update to the current Deliverable will be issued at the end of the project period to follow up on the work with data entry.



CONCLUSIONS

In conclusion, templates have been developed that allow a very broad range of study designs to be entered into a common database format and at least 108 studies (23 observational and 85 others) have now been entered into the templates and/or into the web database (DASH-IN) located at TNO in the Netherlands and UCPH in Denmark. In both databases there are together uploaded at least 28 studies, with both study designs and measurements that are shared with the public (full open access). Moreover we have made a roadmap for how to overcome some of the legal obstacles to data sharing and have identified several sharing scenarios, some fully public and others mainly bilateral. Further work has to be done within partner countries and future projects to further develop the system as well as opening of more data sets to the science community. As the system is now, it is fully ready for data upload and sharing by any scientific group in Europe. It is also fully available for creation of new local dbNP servers and DASH-IN nodes at any server with the required (fairly standard) architecture.

FURTHER DEVELOPMENT AND PERSPECTIVE

The system could be improved by reprogramming of the interface to further ease data upload and sharing, by including many more studies in the system through an improved dissemination network, and by making DASH-IN a supported European infrastructure.



REFERENCES

1. Lakerveld, J., et al., *Towards the integration and development of a cross-European research network and infrastructure: the DETERminants of Diet and Physical ACTivity (DEDIPAC) Knowledge Hub*. Int J Behav Nutr Phys Act, 2014. **11**: p. 143.



TABLE 1. DESCRIPTION OF THE OBSERVATIONAL STUDIES PARTICIPATING IN ENPADASI

Study coordinator/ contact person	Institution (Country)	International/ National/ Regional	Name of Study Study weblink(s)	Funding body	Study design (sampling design)	Scope of the study	Main health-related outcome	Sample size (M/F)	Recruitment (Start /end yr)	Age at recruitment (yrs)	Follow-up (length of FU)
Koenraad Cuypers	WIV-ISP (Belgium)	National (Belgium)	SR https://fcs.wiv-isp.be/SitePages/Home.aspx	Federal Public Service Health and Consumer Protection	Cross-sectional (population-based, stratified random multistage sampling)	Food consumption behaviour at population level	Food intake	3200 (1,600/ 1,600)	2014/ 2015	2004: 15-100; 2014: 3- 64	No
Stefaan Demarest	WIV-ISP (Belgium)	National (Belgium)	Health Interview Survey https://his.wiv-isp.be/FR/SitePages/Accueil.aspx	Federal Public Service Health and Consumer Protection Vlaams Gezondheid Agentschap Communauté Francaise Région Wallonne Région Bruxelloise	Cross-sectional (population-based, stratified random multistage sampling)	Health status and determinants at population level	Prevalence of specific health problems and behaviours	10600 (5,300/ 5,300)	2013/ 2013	0-100	No
Prof. Michèle Guillaume	University of Liège (Belgium)	Regional (Wallonia)	NESCaV www.nescav.com	European Regional Development Fund (FEDER), , Walloon Region and Federation Wallonia-Brussels	Cross-sectional (representative stratified random sample)	Monitoring CV health and risk factors profile among the Greater Region's population	CVDs and risk factors	1,000 (Walloon part) (500/ 500)	2010- 2012	20-69	No



JOINT PROGRAMMING INITIATIVE – A HEALTHY DIET FOR A HEALTHY LIFE EUROPEAN NUTRITION PHENOTYPE ASSESSMENT AND DATA SHARING INITIATIVE

Prof. Michèle Guillaume	University of Liège (Belgium)	Regional (Liège)	-	-	Cross-sectional stratified random sample (for non-organic consumers) and voluntary sample (for organic consumers)	Evaluation of the impact of an organic diet on nutritional balance	-	188 (89/99)	2012-2012	30-40	No
Anne Tjønneland (annet@cancer.dk) Kim Overvad (ko@soci.au.dk)	UCOP (Denmark)	National (limited to Copenhagen and Aarhus municipalities)	Diet, Cancer and Health http://www.cancer.dk/research/diet-genes-environment/dgedch/	Danish Cancer Society	Cohort (population-based, stratified random sampling in predefined study regions)	The relation between diet, lifestyle and the risk and prognosis of cancer and other chronic diseases	Primarily cancer; also CVD, diabetes, respiratory disease, chronic infectious disease, NDD	57,053 (21,178/29,875)	1993/1997 on-going	50-64	Yes (>17y)
Dr. Sirje Vaask (Public Health Department, Ministry of Social Affairs)	NIHD (Estonia)	International (Estonia)	Baltic Nutrition and Health Survey 1997 http://www.euro.who.int/__data/assets/pdf_file/0008/119672/E67884.PDF	The Luxembourg Government, WHO Europe; Ministry of Social Affairs in Estonia	Cross-sectional (Population-based, simple random sampling in predefined age groups)	Provide information on the food consumption patterns and health behaviours of the population of the Baltic States	Variations in dietary patterns and lifestyle behaviours. Highlighted areas to develop and implement national nutrition policies and health promotion campaigns. Development of Estonian dietary guidelines.	2108 (902/1116)	Summer of 1997	19-65	No



JOINT PROGRAMMING INITIATIVE – A HEALTHY DIET FOR A HEALTHY LIFE EUROPEAN NUTRITION PHENOTYPE ASSESSMENT AND DATA SHARING INITIATIVE

Dr. Eha Nurk, Department of Surveillance and Evaluation, National Institute for Health Development	NIHD (Estonia)	International (Estonia)	National Dietary Survey 2014 http://www.tai.ee/toitumisuuring	Estonian Research Council, EU European Regional Development Fund, European Food Safety Authority, National Institute for Health Development, and Estonian Ministry of Agriculture	Cross-sectional (Population- based, stratified random sampling in predefined age, sex, nationality groups and study regions, taking into account even distribution in seasons and week days)	Provide information on the food consumption patterns and health behaviours of the population of Estonia	Identification of CVD, cancer, diabetes and obesity risk factors in dietary patterns and lifestyle behaviours.	Expected 4470 (2235/ 2235)	Nov 2013 - May 2015	4 mo-74 yrs	No
Prof. K.-H. Jöckel (Nationale Kohorte e.V.), Prof. Dr. Tobias Pischon (MDC part)	MDC (Germany)	National (Germany)	National Cohort www.nationalekohorte.de	German federal ministry, German countries, Helmholtz Association	Cohort (population- based, stratified random sampling in predefined study regions)	Identification of risk factors for major chronic diseases	CVD, cancer, diabetes, respiratory disease, chronic infectious disease, NDD	200,000 (100,000 / 100,000) Germany (5000/ 5000) MDC	2014 on- going	20-69	Yes (20-30y)
Prof. Dr. Jakob Linseisen (HMGU)/ Prof. Dr. Georg Karg (TUM)	HMGU (Germany)	Regional (Bavaria)	Bavarian Food Consumption Survey II (BVS II)	Bavarian State Ministry for the Environment, Public Health and Consumer Protection	Cross-sectional (population- based, representative for the Bavarian population, three stage random sampling procedure)	Investigation of dietary and lifestyle habits among the German Bavarian population	Chronic diseases (e.g. CV, respiratory, allergies), biomarkers	1050 (442/ 608)	Sept. 2002/ June 2003	13-80	No



JOINT PROGRAMMING INITIATIVE – A HEALTHY DIET FOR A HEALTHY LIFE EUROPEAN NUTRITION PHENOTYPE ASSESSMENT AND DATA SHARING INITIATIVE

Dr. Thorsten Heuer Prof. Dr. Ingrid Hoffmann	MRI (Germany)	National (Germany)	German National Nutrition Survey II http://www.mri.bund.de/no_cache/de/institute/ernaehrungsverhalten/forschungsprojekte/die-nationale-verzehrsstudie-zwei.html	German Federal Ministry of Food, Agriculture and Consumer Protection (BMELV)	Cross-sectional (Population register, two-stage random sampling procedure (500 sample points))	Providing representative data on food consumption, nutrient intake and further aspects of nutritional behaviour of the German population	-	19,329 (8,923/10,406)	2005/2007	14-80	-
Prof. Dr. Ute Nöthlings	University of Bonn (Germany)	Dortmund, Germany,	DORTMUND Nutritional and Anthropometric Longitudinally Designed (DONALD) study http://www.ernaehrungsepidemiologie.uni-bonn.de/forschung/donald-1	Federal state North Rhine-Westphalia, Germany	Cohort (volunteers)	Cohort study into diet	-	ca. 1500 (750/750)	Since 1985	infancy (aged 3 mo)	Yes (yearly)
Prof. Dr. S. Blankenberg (PI); PD Dr. B.-Chr. Zyriax; Frau Dr. med. Annika Jagodzinski (nutrition and lifestyle)	University Hospital Hamburg-Eppendorf (UKE) (Germany)	Regional, Hamburg area	Hamburg City Health Study (HCHS) http://hch-study.com/	Various private and commercial grants and sponsorships	Cohort (population-based)	Identification of risk factors for major chronic diseases	CVD, NDD, oral and dental health, cancer	45.000 (mono-center) (22,500/22,500)	Since May 2015	45-74	Yes (min. 6 yrs, planned indefinitely)



JOINT PROGRAMMING INITIATIVE – A HEALTHY DIET FOR A HEALTHY LIFE EUROPEAN NUTRITION PHENOTYPE ASSESSMENT AND DATA SHARING INITIATIVE

Prof. Anne Molloy (Trinity College Dublin)	TCD (Ireland)	National	The Trinity, Ulster, Department of Agriculture (TUDA) ageing cohort study http://www.ucd.ie/jingo/	Irish Department of Agriculture, Fisheries and Food; The Northern Ireland Department for Employment and Learning	Cohort (Population based, targeted recruitment of non-institutionalised adults from either hospital clinics or the community, in sub-cohorts to focus on three common diseases of ageing: cognitive dysfunction, bone disease or hypertension)	Investigation of nutritional factors, related gene-nutrient interactions and health and lifestyle factors in the development of chronic diseases of ageing in non-institutionalized adults	Chronic conditions of ageing such as CVD, bone disease and cognitive disease	5,186 (1,699/3,487)	2008-2012 on-going	60-102	Yes (planned)
Dr Janette Walton	UCC (Ireland)	National	National Adult Nutrition Survey www.iuna.net	Department of Agriculture, Food and the Marine	Cross-sectional (population-based, stratified random sampling in predefined study regions)	National Food Consumption Survey	Dietary adequacy	1500 (740/760)	2008-2010	>18 years	No
Prof. Claudio Franceschi and Aurelia Santoro, PhD (University of Bologna)	University of Bologna (Italy)	International	NU-AGE www.nu-age.eu	European Commission - FP7 - Food, Agriculture and Fisheries and Biotechnology Theme	Case-control (stratified random sampling) Case: followed a 1-year diet intervention Controls: no diet followed	Study the effect of the Mediterranean Diet, fortified for the elderly needs, on longevity and aging	-	1272 (557/715)	2012/2016	65-79	Yes (1y)



JOINT PROGRAMMING INITIATIVE – A HEALTHY DIET FOR A HEALTHY LIFE EUROPEAN NUTRITION PHENOTYPE ASSESSMENT AND DATA SHARING INITIATIVE

Massimo D'Archivio (ISS)	CRA-Nut (Italy)	Regional (Lazio, Italy)	AIRC Project: Predicting tumor development risk by an integrated approach linking diet-related inflammation to colon cancer No website	Italian Ministry of Health	Case-control study CASE: cancer colon subject; CONTROL: subjects undergoing abdominal surgery for benign condition	Identification of mechanistic links connecting dietary components, inflammation, and colon cancer.	Cancer	48 (24/24)	2014/2015 on-going	28-78	No
Prof. Paolo Gasparini	IRCCS Burlo Garofolo (Italy)	Regional (Friuli Venezia Giulia)	INGI-FVG No website	Italian Ministry of Health	Other (Sampling of whole isolated populations)	Identification of the genetic bases of complex traits/ disorders	-	1.444 (610/834)	on going	18-99	Yes (5y)
Prof. Paolo Gasparini	IRCCS Burlo Garofolo (Italy)	Regional (Puglia)	INGI-CARL No website	Italian Ministry of Health	Other (Sampling of whole isolated populations)	Identification of the genetic bases of complex traits/ disorders	-	538 (223/315)	2008	18-99	No
Prof. Paolo Gasparini	IRCCS Burlo Garofolo (Italy)	-	SR No website	Italian Ministry of Health	Other (Sampling of whole isolated populations)	Identification of the genetic bases of complex traits/ disorders	-	692 (270/422)	2010/2013	18-99	No
Marco Gobbetti/Maria De Angelis	UNIBA (Italy)	National	Diet4MicroGut http://www.diet4microgut.it/index.php?lang=en	Italian Ministry (PRIN-MIUR)	Cohort (population-based, stratified random sampling on style of diet (omnivore, vegetarian or vegan))	Study of the microbiota and the related metabolome as affected by omnivore, vegetarian or vegan diets	Correlation between dietary habits and human microbiome and metabolome	161 (67/94)	2013/2016 on-going	18-55	No (3 y)



JOINT PROGRAMMING INITIATIVE – A HEALTHY DIET FOR A HEALTHY LIFE EUROPEAN NUTRITION PHENOTYPE ASSESSMENT AND DATA SHARING INITIATIVE

Gemma Rojo-Martínez	CIBERDEM (Spain)	National (Spain)	di@bet.es study http://www.ciberdem.org/en/estudio_diabetes.php	Spanish Government	Cross-sectional (population-based, cluster sampling)	Type 2 diabetes, obesity, high blood pressure	Type 2 diabetes (OGTT), Blood Pressure, Total and HDL Chol, Triglycerides, obesity, visceral obesity, insulin resistance (HOMA)	~5000 (2000/3000)	2008-2010	18-100	Yes (6y)
Gemma Rojo-Martínez	CIBERDEM (Spain)	Regional (Pizarra town)	Pizarra study No website	Spanish/Andalusian Government	Cohort (population-based, random sampling)	Type 2 diabetes, obesity, high blood pressure	Type 2 diabetes (OGTT), Blood Pressure, Total and HDL Chol, Triglycerides, obesity, visceral obesity, insulin resistance (HOMA)	~900 (360/540)	1996-2007	18-65	Yes (10y)
Prof. Lluís Masana and Jordi Merino (Vascular Medicine and Metabolism Unit)	CIBERDEM (Spain)	National (Spain)	METBANC No website	CIBERDEM	Cohort (patients-based study)	Role of emerging CV risk factors on subclinical atherosclerosis and CVD	Carotid plaque, endothelial dysfunction, CVD	patients at Δ CV risk ~ 1000 (400/600)	2007-2014	20-70	No

CV: Cardiovascular; CVD: Cardiovascular disease(s); Neurodegenerative disease(s) (NDD)



TABLE 2. DIETARY INTAKE ASSESSMENTS CONDUCTED IN THE OBSERVATIONAL STUDIES PARTICIPATING IN ENPADASI

Name of Study	Country	24-hour recall	FFQ	Food records	Other
Food Consumption Survey 2004/2014	Belgium	√	√		
Health Interview Survey	Belgium				√
NESCaV	Belgium		√		
-	Belgium		√		
Diet, Cancer and Health	Denmark	√	√		
Baltic Nutrition and Health Survey 1997	Estonia	√			
National Dietary Survey 2014	Estonia	√	√	√	√
National Cohort	Germany	√	√		
BVS II study	Germany	√			√
NVS II	Germany	√		√	√
DONALD study	Germany			√	
HCHS	Germany		√		
TUDA study	Ireland		√		
National Adult Nutrition Survey	Ireland	√		√	
NU-AGE	Italy			√	√
AIRC Project	Italy	√	√	√	
INGI-FVG	Italy		√		
INGI-CARL	Italy				
SR	Italy				
Diet4MicroGut	Italy	√	√	√	
di@bet.es study	Spain		√		
Pizarra study	Spain		√	√	
METBANC	Spain	√	√	√	

FFQ: Food frequency questionnaire



TABLE 3. DESCRIPTION OF OTHER MEASUREMENTS ASSESSED IN THE OBSERVATIONAL STUDIES PARTICIPATING IN ENPADASI.

Name of Study	Country	Alcohol consumption	Tobacco consumption	Physical Activity	Sedentary behaviour	Anthropometric measurements	SES	Health status
Food Consumption Survey 2004/2014	Belgium	√	√	√	√	√	√	√
Health Interview Survey	Belgium	√	√	√		√	√	√
NESCaV	Belgium	√	√	√	√	√	√	√
-	Belgium	√	√	√		√	√	
Diet, Cancer and Health	Denmark	√	√	√		√	√	√
Baltic Nutrition and Health Survey 1997	Estonia	√	√	√	√	√	√	√
National Dietary Survey 2014	Estonia	√	√	√	√	√	√	√
National Cohort	Germany	√	√	√		√	√	√
BVS II	Germany	√	√	√	√	√	√	√
NVS II	Germany	√	√	√	√	√	√	√
DONALD study	Germany	√	√	√	√	√	√	√
HCHS study	Germany	√	√	√		√	√	√
TUDA study	Ireland	√	√	√		√	√	√
National Adult Nutrition Survey	Ireland	√	√	√	√	√	√	√
NU-AGE	Italy	√	√	√	√	√	√	√
AIRC Project	Italy	√		√		√	√	√
INGI-FVG	Italy	√	√	√			√	√
INGI-CARL	Italy	√	√	√			√	√
SR	Italy	√	√	√			√	√
Diet4MicroGut	Italy	√	√	√		√	√	√
di@bet.es study	Spain	√	√	√		√	√	√
Pizarra study	Spain	√	√	√		√	√	√
METBANC	Spain	√	√	√		√		√



TABLE 4. MEASUREMENTS ASSESSED IN SAMPLES FROM THE OBSERVATIONAL STUDIES PARTICIPATING IN ENPADASI

Study name	Country	Biomarkers measurements					Metabolomics	Proteomics	Genomics/ transcripto mics
		L	G/I	Inflam.	Adip.	Other			
Food Consumption Survey 2004/2014	Belgium								
Health Interview Survey	Belgium								
NESCaV	Belgium	√	√	√		√			
-	Belgium								
Diet, Cancer and Health	Denmark	√	√				√		√
Baltic Nutrition and Health Survey 1997	Estonia								
National Dietary Survey 2014	Estonia								
National Cohort	Germany	√	√						
BVS II study	Germany	√	√	√	√	√			√
NVS II	Germany								
DONALD study	Germany	√	√	√	√				
HCHS	Germany	√	√						√*
TUDA study	Ireland	√	√	√		√			√
National Adult Nutrition Survey	Ireland	√	√	√	√	√	√	√	√
NU-AGE	Italy	√	√	√	√	√	√	√	√
AIRC Project	Italy			√	√	√			√
INGI-FVG	Italy	√	√				√		√
INGI-CARL	Italy	√	√						√
SR	Italy								√
Diet4MicroGut	Italy						√	√	√
di@bet.es study	Spain	√	√	√		√			√
Pizarra study	Spain	√	√	√	√	√			√
METBANC	Spain	√	√	√	√	√			√

BM: Biomarkers; L: Lipids; G/I: Glucose/Insulin; Inflam.: Inflammatory; Adip.: adiposity; *DNA available but no measurements done.



TABLE 5. AVAILABILITY OF OBSERVATIONAL STUDIES TO STORE AND SHARE DATA

Study coordinator/ contact person	Institution (Country)	International/ National/ Regional	Name of Study	Ethics Committee approval	Informed consent provided	Willing to store and share raw data within ENPADASI	Willing to store and share raw data for other specific research projects	Willing to store and share metadata
Koenraad Cuypers	WIV-ISP (Belgium)	National (Belgium)	SR	Yes	Yes	Yes probably	Yes probably	Yes probably
Stefaan Demarest	WIV-ISP (Belgium)	National (Belgium)	Health Interview Survey	Yes	No	Yes probably	Yes probably	Yes probably
Prof. Michèle Guillaume	University of Liège (Belgium)	Regional (Wallonia)	NESCaV	Yes	Yes	Yes probably	Yes probably	Yes probably
Prof. Michèle Guillaume	University of Liège (Belgium)	Regional (Liège)	-	Yes	Yes	Yes probably	Yes probably	Yes probably
Anne Tjønneland Kim Overvad	UCOP (Denmark)	National (limited to Copenhagen and Aarhus municipalities)	Diet, Cancer and Health	Yes	Yes	No	Yes if application is approved by DCH board	Yes if application is approved by DCH board
Dr. Sirje Vaask (Public Health Department, Ministry of Social Affairs)	NIHD (Estonia)	International (Estonia)	Baltic Nutrition and Health Survey 1997	Yes	Yes	needs confirmation	needs confirmation	needs confirmation
Dr. Eha Nurk, Department of Surveillance and Evaluation, National Institute for Health Development	NIHD (Estonia)	International (Estonia)	National Dietary Survey 2014	Yes	Yes	needs confirmation	needs confirmation	needs confirmation



JOINT PROGRAMMING INITIATIVE – A HEALTHY DIET FOR A HEALTHY LIFE EUROPEAN NUTRITION PHENOTYPE ASSESSMENT AND DATA SHARING INITIATIVE

Prof. K.-H. Jöckel (Nationale Kohorte e.V.), Prof. Dr. Tobias Pischon (MDC part)	MDC (Germany)	National (Germany)	National Cohort	Yes	Yes	(Just started)	Yes	(Just started)
Prof. Dr. Jakob Linseisen (HMGU)/ Prof. Dr. Georg Karg (TUM)	HMGU (Germany)	Regional (Bavaria)	Bavarian Food Consumption Survey II (BVS II)	Yes	Yes	No	Yes	Yes
Dr. Thorsten Heuer Prof. Dr. Ingrid Hoffmann	MRI (Germany)	National (Germany)	German National Nutrition Survey II	Yes*	Yes	No	Yes [§]	Yes, dependent on the specific conditions and access rules
Prof. Dr. Ute Nöthlings	University of Bonn (Germany)	Dortmund, Germany,	Dortmund Nutritional and Anthropometric Longitudinally Designed (DONALD) study	Yes/No	Yes	No	Yes, project specific, upon individual request	Yes
Prof. Dr. S. Blankenberg (PI); PD Dr. B.-Chr. Zyriax; Frau Dr. med. Annika Jagodzinski	University Hospital Hamburg-Eppendorf (UKE) (Germany)	Regional, Hamburg area	Hamburg City Health Study (HCHS)	Yes	Yes	No	No	Yes probably
Prof. Anne Molloy (Trinity College Dublin) Prof. Helene McNulty (Ulster University)	TCD (Ireland)	National	The Trinity, Ulster, Department of Agriculture (TUDA) ageing cohort study	Yes	Yes	No	No	Yes
Dr Janette Walton	UCC (Ireland)	National	National Adult Nutrition Survey	Yes	Yes	No	No	Yes/No



JOINT PROGRAMMING INITIATIVE – A HEALTHY DIET FOR A HEALTHY LIFE EUROPEAN NUTRITION PHENOTYPE ASSESSMENT AND DATA SHARING INITIATIVE

Prof. Claudio Franceschi and Aurelia Santoro, PhD (University of Bologna)	University of Bologna (Italy)	International	NU-AGE	Yes	Yes	No	No	Yes
Massimo D'Archivio (ISS)	CRA-Nut (Italy)	Regional (Lazio, Italy)	AIRC Project:	Yes	Yes	No	No	Yes (ongoing)
Prof. Paolo Gasparini	IRCCS Burlo Garofolo (Italy)	Regional (Friuli Venezia Giulia)	INGI-FVG	Yes	Yes	Partly	Partly	Yes
Prof. Paolo Gasparini	IRCCS Burlo Garofolo (Italy)	Regional (Puglia)	INGI-CARL	Yes	Yes	Partly	Partly	Yes
Prof. Paolo Gasparini	IRCCS Burlo Garofolo (Italy)	-	SR	Yes	Yes	Partly	Partly	Yes
Marco Gobbetti/Maria De Angelis	UNIBA (Italy)	National	Diet4MicroGut		Yes	(Just started)	Yes	(Just started)
Gemma Rojo-Martínez	CIBERDEM (Spain)	National (Spain)	di@bet.es study	Yes	Yes	Yes	Yes	Yes
Gemma Rojo-Martínez	CIBERDEM (Spain)	Regional (Pizarra town)	Pizarra study	Yes	Yes	Yes	Yes	Yes
Prof. Lluís Masana and Jordi Merino	CIBERDEM (Spain)	National (Spain)	METBANC	Yes	Yes	Yes with an agreement form	Yes (agreement form and potential collaboration)	Yes

*Approval by the German Federal Data Protection Office; [§]It is possible for specific research projects via Scientific Use File or via cooperation. The regulations on the NVS II data restrict the use to universities, public and/or publicly funded scientific research institutions. Furthermore, a general essential prerequisite is the pure scientific use of NVS II data, excluding any commercial use of the data and of the derived results.



TABLE 6. AVAILABILITY OF EXPERIMENTAL STUDIES WITH FULLY OR PARTIALLY SHARED DATA

Study ID	Study short descriptor	Study subjects	Open	Data	Design	Type and duration	Exposure	Endpoints
NASH	Adipose Tissue Dysfunction Signals Progression of Hepatic Steatosis Towards Nonalcoholic Steatohepatitis in C57Bl/6 Mice	18 Mus musculus	Yes	Meta	Parallel	Dietary intervention	High- or low-fat diets	Histology, protein multiplex array, liver triglycerides
	Assessment of Dietary Modulation of Inflammatory Tone (ADMIT)	15 Homo sapiens	Yes	Full data	Cross-over	Dietary challenge tests	(glucose ± lipids) or water	Proteomics, Physiology, Clinical chemistry
	Baysian Probit regression model for the diagnosis of pulmonary fibrosis: proof-of-principle	11 Homo sapiens	Yes	Full data	Observation	-	Gene expression signatures from non-neoplastic lung tissue	Transcriptomics
	Novel effects of docosahexaenoic acid (DHA) on gene expression and pathways in human vascular endothelium under pro-inflammatory conditions.	1 Homo sapiens	Yes	Meta, Not finalized	Parallel	Cell incubation	Docosahexaenoic acid (DHA)	Proinflammatory gene expression



JOINT PROGRAMMING INITIATIVE – A HEALTHY DIET FOR A HEALTHY LIFE EUROPEAN NUTRITION PHENOTYPE ASSESSMENT AND DATA SHARING INITIATIVE

	Diclofenac - Relation between reduction of the inflammatory status and glucose metabolism in healthy overweight men	19 Homo sapiens	Yes	Partly full data	Parallel	Anti-inflammatory drug intervention (10d)	Diclofenac or placebo for 10d followed by OGTT	Physiology, Transcriptomics, Clinical chemistry, Metabolomics, Proteomics
Foodmix	Foodmix - Effect of Nutritional Interventions on Inflammatory Status in Healthy Overweight Men	42 Homo sapiens	Yes	Full data	Partial cross-over	Intervention (5w per treatment) with putatively anti-inflammatory food components or each of two probiotics vs. placebo	Mixed food include resveratrol, green tea extract, - tocopherol, vitamin C, n-3 (omega-3) polyunsaturated fatty acids, and tomato extract	Physiology, Clinical chemistry, Transcriptomics, Metabolomics, Proteomics
NuGO_PPSH	Human PPS: an intervention study	10 Homo sapiens	Yes	Full data, partley	Cross-over	fasting challenge	12 or 36hr fasting and repeatability of 12hr fasting response	Proteomics, Transcriptomics, Clinical chemistry, plasma and urine metabolomics (NMR, GC-MS, GC-MS/MS and LC-MS/MS - non-targeted and targeted approaches)
NuGO_PPS1	PPS1 - Development of insulin resistance on a high fat diet in ApoE3 mice	78 Mus musculus	Yes	Meta	Parallel	Dietary intervention	High-fat diet vs. Control (0, 1, 6, 9, or 12 w)	Transcriptomics, metabolomics, lipidomics
NuGO_PPS2	PPS2 - Evaluation of the acute whole-body response to glucose stress in C57BL/6J mice	102 Mus musculus	Yes	Meta	Parallel	Dietary intervention	High-fat diets, 10 or 45 energy% (12w)	OGTT; liver transcriptomics, proteomics, metabolomics



JOINT PROGRAMMING INITIATIVE – A HEALTHY DIET FOR A HEALTHY LIFE EUROPEAN NUTRITION PHENOTYPE ASSESSMENT AND DATA SHARING INITIATIVE

NuGO_PPS3	PPS3 - dose-dependent effects of dietary fat on the organ-specific response in C57BL/6J mice	40 Mus musculus	Yes	Meta	Parallel	Dietary intervention	High-fat diets, 10, 20, 30 or 45 energy% (5d)	Transcriptomics
LIPGENE: European randomized dietary intervention study	Effects of dietary fat modification on insulin sensitivity and on other risk factors of the metabolic syndrome	416 Homo sapiens	Yes	Full data	Parallel	Relative efficacy of altering the quality and quantity of dietary fat	High fat SFA rich diet, a high-fat MUFA-rich diet, an isoenergetic low-fat high complex carbohydrate Diet and an isoenergetic low-fat, high-complex carbohydrate diet with VLC n-3 PUFA.	Clinical chemistry
SU.VI.MAX	"Diet, genomics and the metabolic syndrome: an integrated nutrition, agro-food, social and economic analysis"	1754 Homo sapiens	Yes	Meta	A prospective nested case-control genetic study.			Clinical chemistry
AIRC-ISS	Predicting tumor development risk by an integrated approach linking diet-related inflammation to colon cancer	24 Homo sapiens	Yes	Meta	Parallel	Correlate specific fatty acid profiles	Fatty acid profiles of visceral white adipose tissue (WAT) with inflammatory signatures potentially associated with colorectal cancer.	Physiology, clinical chemistry
HuMet_mrt_2012	The dynamic range of the human metabolome revealed by challenges	15 Homo sapiens	Yes	Full data, but not	Sequential challenges	Challenge test. multiple tests in sequence (4w)	Fasting 36h, exercise, OGTT, OLTT, cold stress,	Clinical chemistry, NMR Metabolomics (targeted)



				open		total)	defined liquid meals	
9218 Fat_challenge tests	Vette KIP	20 Homo sapiens	No	Full data	Parallel and sequential (two studies in one)	OLTT challenge and high-fat diet intervention (2w)	OLTT in healthy and MetS men and OLTT after 4w high-fat diet in the same healthy men.	Questionnaire, Microbiota, Physiology, Transcriptomics, clinical chemistry, Metabolomics
A308 Cheese	Human dietary intervention with cheese vs. Butter	23 Homo sapiens	Yes	Full data	Cross-over	Dietary (food) intervention	Equicaloric diets (6w) with cheese or butter	Anthropometrics, glucose, lipids, metabolomics
M208 Berries	Human dietary challenge with strawberry, sea buckthorn, or water together with a sugar load	18 Homo Sapiens	Yes	Full data	Cross-over meal study	Food challenge	strawberry, sea buckthorn, or water together with a sugar load	Anthropometrics, microbiota, metabolomics, clinical chemistry.
Etherpaths	Effects of Polyphenols and Omega-3 Fatty Acids on Cardiovascular Risk Factors (Focusing on Postprandial Lipids Metabolism) in Subjects With High Risk for Type 2 Diabetes and Cardiovascular Diseases	78 Homo Sapiens, 33 males and 47 females	Yes	Meta	Randomized-controlled dietary intervention trial with a 2x2 factorial design	Dietary intervention with specific diets	(A) Control diet poor in omega-3 fatty acids and polyphenols (B) Diet rich in omega-3 fatty acids (C) Diet rich in polyphenols (D) Diet rich in omega-3 fatty acids and polyphenols	Anthropometrics, glucose, insulin, lipoproteins, metabolomics, microbiome, transcriptome
IFC-NCR DEI	Human endothelial cell culture w/o pretreatment with IL-1-beta	unknown number of individual cell culture flasks	Yes	Meta partially filled	parallel study in a specified cell culture	Compound challenge	Challenge with docosahexaenoic acid	Transcriptome



TUM_MiProMet	To assess the effects of different milk fractions (whey, casein, glycomacropeptide) on the acute metabolic responses and on gastric emptying in healthy and prediabetic individuals	30 Homo Sapiens, 15 healthy and 15 pre-diabetic	Yes	Meta	cross-over meal study	Food challenge	4 different test drinks: - 50 g maltodextrin drink - maltodextrin + 50 g whey isolate drink - maltodextrin + 50 g casein drink - maltodextrin + 50 g glycomacropeptide drink - maltodextrin + 50 g glycomacropeptide drink	Blood glucose, Plasma insulin, Plasma C-peptide, Plasma GLP-1, Plasma GIP, Plasma Glucagon, Plasma Ghrelin, DPPIV activity, Catalase activity, HbA1c, targeted metabolomics (amino acids, acylcarnitines, Catalase activity, HbA1c, targeted metabolomics (amino acids, acylcarnitines, phospholipids)phospholipids)
Poly-Nut	The purpose of this research is to study the effects on insulin sensitivity of overfeeding with or without polyphenols supplementation	40 Homo Sapiens (men).	Yes	Meta	Parallel dietary study	energy ±food component challenge through 31 days	50% overfeeding in combination with 2g polyphenols from pills or they receive placebo pills.	Insulin sensitivity measured with a hyperinsulinemic euglycemic clamp and on post prandial partitioning of exogenous lipids. Metabolomics in urine
Healthgrain	Effect of whole grain intake on cardiovascular risk factors in subject with metabolic syndrome	61 Homo Sapiens (men and women, age range 40-65 years, with the metabolic syndrome	Yes	Meta	Randomized parallel dietary study	Wholegrain or refined cereals	After a 4-week run-in period, participants were randomly assigned to a 12-week dietary intervention	Anthropometrics, plasma lipids and lipoproteins, glucose and insulin, and untargeted metabolomics (LC-MS)



JOINT PROGRAMMING INITIATIVE – A HEALTHY DIET FOR A HEALTHY LIFE EUROPEAN NUTRITION PHENOTYPE ASSESSMENT AND DATA SHARING INITIATIVE

Eurostarch	Long and short-term effects of consumption of high versus low GI starchy foods on glucose metabolism and cardiometabolic profile	38 Homo Sapiens (overweight, non-diabetic)	Yes	Meta	Randomized parallel dietary study	Low-Glycaemic index vs. high-glycaemic index diets	5-week dietary intervention	body weight, lipid profile, fasting glucose, postprandial glucose profile
FORCE-MONA	Effects of 20% calorie restriction	26 Homo Sapiens (obese males, aged 30-40 or 60-70)	No	?	Randomized parallel dietary study	Low-calorie diets in old vs. young obese males	8-week dietary intervention	Muscle and adipose tissue metabolic adaptations, energy expenditure, energy (substrate) oxidation, lipoproteins.
M221 Seaweed	Human dietary challenge with kombu seaweed, wakame seaweed or control together with a starch load	20 Homo sapiens	Yes	Meta	Cross-over	Food challenge	Acute effect of kombu seaweed, wakame seaweed or control together with a starch load	Anthropometrics, clinical chemistry and VAS_ questionnaire
MNGWP3-UCPH	Human dietary intervention with high fibre diet (prebiotic fibres) and high PUFA diet	30 Homo Sapiens	No	Meta	Blinded 3-way RCT	Dietary intervention	Dietary intervention with high fibre diet (prebiotic fibres) and high PUFA diet (2 x 4w)	Blood, urin, feces, questionnaire, silaiva, adipose tissue fat biopsy, body composition, resting energy expenditure, hydrogen breath test, blood pressure, physical activity
	Human dietary supplementation with Vitamin C	5Homo Sapiens	Yes	Meta	Bedfore and after	Short term (5h) vitamin supplementation	The effect of vitamin C supplementation on gene expression in peripheral blood mononuclear cells	Genetic_Variation, clinical chemistry, meta-genome



<p>M187 Farm- trout</p>	<p>The Effects of Trout Fed With a Vegetable Based Feed on Cardiovascular Risk Markers and Plasma Proteome. The objective of the study is to investigate the effect of vegetable based feed versus marine feed of farmed trout and its effect in healthy men on cardiovascular risk markers associated with the development of cardiovascular disease (CVD).</p>	<p>68 Homo Sapiens (Healthy men aged 40-70 years, body mass index 18,5 - 30.)</p>	<p>Yes</p>	<p>Full data</p>	<p>Randomized parallel study</p>	<p>8 weeks dietary intervention</p>	<p>Short term dietary intervention: 3 diets (vegetable based feed / marine feed of farmed trout with chicken as control)</p>	<p>Blood, questionnaire, blood pressure and anthropometrics investigated for inflammatory markers, fatty acids and lipid metabolism. Vascular function (vascular reactivity, vascular stiffness), cholesterol levels, gut microbiota plasma metabolomics, urine metabolomics, microbiota, inflammatory markers, cholesterol and lipids</p>
<p>M143 six-a-day study.</p>	<p>Effects of fruit and vegetable on surrogate markers of oxidative damage to DNA, protein and lipids, enzymic defence and lipid metabolism determined in blood and urine</p>	<p>43 Homo Sapiens (22 men and 21 females, all healthy)</p>	<p>Yes</p>	<p>Full data</p>	<p>Cross over design with 3 arms</p>	<p>Short term dietary intervention: 3 diets (fruit and vegetable / vitamin pill /placebo).</p>	<p>The basic part of the diets served to all 3 groups consisted of 5 menus repeated in a 7-d cycle. The menus consisted of Fruveg group, supplement group and placebo group.</p>	<p>Fasting blood, postprandial blood, spot urine and 24h urine assessed for inflammatory markers, oxidative stress, and lipid and glucose metabolism</p>
<p>AVAG</p>	<p>A dietary intervention with high polyphenol apples targeting vascular function and CVD risk and gut health, and generating metabolite profiles in biofluids and gut metagenomics/metataxonomics</p>	<p>40 Homo sapiens (M and F)</p>	<p>Yes</p>	<p>Meta</p>	<p>Randomized parallel study, with two arms.</p>	<p>8 weeks dietary intervention.</p>	<p>Two 2 apples per day or "apple" flavoured, sugar matched drink (low polyphenol content).</p>	<p>Vascular function (vascular reactivity, vascular stiffness), cholesterol levels, gut microbiota plasma metabolomics, urine metabolomics, microbiota, inflammatory markers, cholesterol and lipids</p>



JOINT PROGRAMMING INITIATIVE – A HEALTHY DIET FOR A HEALTHY LIFE EUROPEAN NUTRITION PHENOTYPE ASSESSMENT AND DATA SHARING INITIATIVE

FLAVURS	Targeting CVD risk (vascular function) and bio fluid metabolite profiles	174 Homo sapiens (106 men/68 females)	Yes	Meta	Randomized parallel dietary study With 3 arms.	Dietary intervention 18 weeks (every six weeks portion F&V increased: 2-4- and 6- additional portions)	High Flavonol (HF) diet >15 mg/100 g; LowFlavonol (LF) Diet <5mg/100mg ; Control Diet (CT)	Urine metabolomics, fatty acids, insulin, glucose, ascorbate, LDL oxidation, triglycerides (lipid metabolism)
AGER-MELO	Identification of metabolic products of various classes of apple polyphenols upon ingestion. A second aim was to evaluate whether an higher concentration of polyphenols in the apple matrix, i.e. the consumption from the same volunteers either of the cloudy apple juice (CAJ) or the polyphenol enriched apple juice (PAJ) would lead to a corresponding increased metabolic output.	12 Homo sapiens (8 males and 4 females), aged 21 to 42 years, with a BMI between 18.5 and 25.	Yes	Meta	Parallel design.	Dietary intervention investigating the acute intake of apples	Cloudy apple juice (CAJ) or polyphenol enriched apple juice (PAJ).	Untargeted metabolomic approach and to follow in the nutrikinetics of these metabolites in plasma and urine over respectively a 5 h and 24 h period + assess whether particular profiles of apple derived plasma/urine metabolites could be related to individual members of the gut microbiota.
CHDR1211_phenflex_1	Standardized dietary challenges in healthy and diabetic subjects	40 Homo sapiens	Yes	? no access	Parallel design.	Diet challenge, Compound challenge.	High fat challenge (OLTT) and oral glucose challenge (OGTT)	Metabolomics, clinical chemistry
NCT02710513	Human dietary intervention with barley pasta.	26 Homo sapiens	No	Meta	Cross over, before and after	Diet intervention 8 weeks	Intake (3g) of barley β -glucans on fecal microbiota and metabolome in healthy subjects.	Questionnaire, Microbiota, Physiology, clinical chemistry



JOINT PROGRAMMING INITIATIVE – A HEALTHY DIET FOR A HEALTHY LIFE EUROPEAN NUTRITION PHENOTYPE ASSESSMENT AND DATA SHARING INITIATIVE

MECHE	Nutrigenomics response to OGTT or OLTT	214 Homo sapiens (100 males/114 females)	No	?	Randomized parallel dietary study	OGTT (2hr), OLTT (5hr), Physical function (2.5hrs) Dietary intervention	Oral Glucose Tolerance test Oral Lipid Tolerance test	FFQ, blood Basic biochemistry, MetS biochemistry, Protein profiling via NMR metabolomics.
PREDIMED	Effects of Mediterranean diet vs control diet on intermediate cardiovascular risk parameters	90 Homo sapiens (40%M/60%F), High cardiovascular risk participants	No	?	Randomized parallel study	3 months dietary	Mediterranean diet supplemented with extra virgin olive oil or nuts.	Plasma lipids, fasting glucose, blood pressure, BMI, other cardiovascular disease biomarkersProteomics
OBENUTIC INTERVENTION	Comparison between hypocaloric diet vs increased physical activity for weight loss.	50 Homo sapiens (40% male/60% female), healthy.	NO	?	Randomized parallel study, with two arms.	2 months	Hypocaloric diet, physical activity.	FFQ and other lifestyle questionnaires and weight loss, Plasma lipids, fasting glucose, blood pressure, BMI, other cardiovascular disease biomarkers.
Egabro study	Prevention of diabetes with Mediterranean lifestyle	100 Homo sapiens (35M/65F) with Impaired OGTT	Yes	?	Randomized parallel study, with two arms.	24 months	Mediterranean diet/lifestyle and general advice.	Regular interviews, 24h recall, FFQ and OGTT results, body weight + serum lipids and iodine.
UCD_TWIN	To explore the genetic and diet related factors that influence metabolic phenotypes in monozygotic (identical) and dizygotic (non-identical) adult twins.	138 Homo sapiens	Yes	Meta	?	?	?	?



Not disclosed	Saturated fatty acids		22	Clinical chemistry, transcriptomics
Not disclosed	Butyrate in morbid obese subjects		24	
Not disclosed		GTT, LTT	40	Clinical chemistry, metabolomics
Not disclosed	Pre-diabetic subjects		30	
Not disclosed	n3-PUFA, low caloric diet	GTT, LTT	151	Physiology, metabolomics, clinical chemistry
Not disclosed	n3-PUFA		77	Clinical chemistry, physiology
Not disclosed	Whole grain wheat		50	
Not disclosed	Pulmonary fibrosis		11	Transcriptomics



Not disclosed	Observational	GTT, LTT, activity	214	Clinical chemistry, physiology, genetic variation, transcriptomics
Not disclosed	Challenges	GTT	79	Metabolomics, clinical chemistry
Not disclosed	Fibre, PUFA		30	Microbiome, clinical chemistry
Not disclosed	Observational		1500	Food consumption
Not disclosed	Food addiction			Microbiome, Metatranscriptome
Not disclosed	Caloric restriction	GTT, LTT	72	Microbiome, physiology, clinical chemistry, metabolomics
Not disclosed	High fat diet		100	Clinical chemistry, metabolomics
Not disclosed	Varying protein % and type in diet		42	Microbiome, metabolomics



Not disclosed	Observational		5186	
Not disclosed	Vegetable rich diet		32	Physiology, clinical chemistry, metabolomics, transcriptomics, proteomics
Not disclosed	Alcohol	LPS	24	Physiology, clinical chemistry, metabolomics, proteomics
Not disclosed	Dark chocolate		41	Physiology, clinical chemistry
Not disclosed	High fat		42	Physiology, clinical chemistry