nutrishield

Welcome to the 5th NUTRISHIELD e-Bulletin!

Issue 5 / October 2021

In this issue

Key Facts

Grant Agreement:
No 818110
Call:
H2020-SFS-2018-1
Start date:
01 November 2018
Duration:
48 months
Coordinator:
Alpes Lasers SA

Project Overview

NUTRISHIELD is an innovative solution, providing personalised nutrition advice and support that will assist people in achieving their optimal health and well-being and adopting long-term healthy and sustainable diets.

NUTRISHIELD aims to integrate laboratory techniques, methodologies, ICT devices & applications, algorithms and other components into one platform and validate it in clinical conditions.

The Challenge

To create a platform that

- promotes safe food for the population,
- enables consumers to make informed choices and
- ensures that the proposed choices will have good chances of being adopted

Assist consumers understand:

- why each food is being suggested,
- what implications each choice may have

Expected Impact

- Empowered consumers able to make healthy and sustainable dietary choices
- Personalised diets upon scientific-based dietary assessment and advice
- Increased consumer trust in personalised nutrition advice and/or support
- Prevention of diet-related and non-communicable diseases
- Quality-Of-Life, Health and Safety of the citizens

Latest Articles in Our Blog

Impact of Pasteurization on Donor Human Milk's Composition

Human milk (HM) is the gold standard for infant nutrition, as it has the optimum composition of nutritional elements needed for growth and development, providing numerous short and long-term benefits for infants. Early infant nutrition is very important for improving clinical outcomes and, based on all its benefits, HM is the first choice for feeding preterm infants.

When not enough own mother's milk (OMM) is available, pasteurized donor human milk (DHM) is currently the preferred alternative for preterm infants rather than premature infant formula.

Read the full post

The NUTRISHIELD Breath Analyzer

Our previous blog post describes the analysis of exhaled breath using molecular spectroscopy for determining the concertation of volatile organic compounds which serve as biomarkers. Molecular spectroscopy is elegant because it does not use consumables, it is non-invasive and quick, and measurement and analysis can be performed in about a minute.

Among the gases which can serve as biomarker for a specific health condition is hydrogen (H_2). Hydrogen is indicative of certain conditions of gastro-intestinal disorders.

Hydrogen and methane breath testing is a widely used diagnostic tool, based on the science that these gases are byproducts of saccharide fermentation by gut microorganisms, rather than human metabolism. Glucose, lactose, and fructose are normally absorbed in the small intestine.

Increased gas production following their ingestion is associated with malabsorption or premature fermentation due to excessive bacteria in the small intestine. Hydrogen and methane are absorbed from the gastrointestinal tract, exhaled via the lungs and are thus measurable in breath.

Read the full post

The NUTRISHIELD Analysers

NUTRISHIELD Human Milk Analyser Prototype

Human milk analysis gives information on its nutritional composition. It is very crucial for an infant's health, especially for pre-term infants, to feed them with high quality milk. The nutrition correlates with the development of the body and brain and can set its course of life.

During the research project QuantaRed Technologies GmbH is developing a completely new human milk analysis prototype with integrated novel laser sources. At the moment, the determination of the analytes requires two different methods, laboratory staff, time and consumables. The novel NUTRISHIELD human milk prototype will provide these determinations in one device.

The prototype aims at a completely automated procedure. The integrated autosampler provides the opportunity to measure 9 samples, without involvement of the end-user. During the measurement process, the device is cleaned properly with the cleaning solutions attached at the back.

The prototype provides a lot of benefits for the potential users, amongst which are: Being portable, integrated touchscreen, no laboratory staff necessary and self-explanatory.

Within the research project and the included use case studies the NUTRISHIELD Human Milk Prototype will be further developed, tested and validated in the next few months.

NUTRISHIELD Urine Analyser Prototype

Standard urine analysis gives information about the medical state of the patient. With the quantified biomarkers the doctor can intervene, if necessary, to improve the patient's health.

Some standard methods for urine analysis are using special reagents to transform the analytes to a detectable modification. Afterwards, a colorimetric measurement of the mixture is taking place. In contrast, the NUTRISHIELD Urine Analyser Prototype is planning on not using any chemical reactions and therefore not needing any reagents. This facilitates a user friendly and safe operation. Apart from this advantage, the goal of the protoype is measuring two health indicators at once.

The NUTRISHIELD urine analyser prototype is aiming at the following points:

- Being portable
- Easy usability (touch display)
- Using a small sample volume
- No laboratory staff necessary
- Self-explanatory
- No reagents necessary
- No consumables

Within the research project and the use cases the NUTRISHIELD Urine Analyser Prototype will be further developed, tested and validated in the next few months.

The NUTRISHIELD urine pH sensor

The user interface will guide the user through the measurements. Six urine can be measure simultaneously, 1 urine per instrument channel. The analysis of urine consists of the following steps:

Data entry

- Enter for each patient the correspondent patient-id in the respective instrument-channels box (1-6)

Analysis (A message will be always displayed before each measurement (calibration 1, calibration 2 and urine sample) explaining which solution must be drop on the sensor):

- Drop Cal 1 solution (80 ul) on the sensor (by covering all the 3 electrodes on it) and then start the calibration 1 by selecting "**Start**" – (measurement time 100 seconds)
- Drop Cal 2 solution (80 ul) on the sensor (by covering all the 3 electrodes on it) and then start the calibration 1 by selecting "**Start**" – (measurement time 100 seconds)

Drop the urine sample (80 ul) on the sensor (by covering all the 3 electrodes on it) and then start the urine measurement by selecting "**Start**" (measurement time 100 seconds)

Calculation of pH and display analysis results

- Select "**Processing**" in order to process the data (<30 seconds)
- A pH value will be shown for each of the analyzed urines

Store or/and transfer analysis results with patient id

The NUTRISHIELD Breath Analyser

The user interface will guide the user through a measurement. The analysis of breath consists of the following steps:

Data entry

- Enter patient-id as provided by NUTRISHIELD platform (to be performed by personnel)

Analysis

- Start the analysis by selecting "Analysis"
- The analyzing system is checked and internal measurements are performed (t< 1minute)
- On command the person whose breath is to be analyzed breathes into a mouthpiece in order to fill the cells with breath
- A measurement of the breath in the cell is performed (t < 1 minute)
- Data evaluation

Calculation of concentrations

Display analysis results

Store or/and transfer analysis results with patient id

The NUTRISHIELD Events

The NUTRISHIELD Project at The European Researchers' Night 2021

On Friday September 24th, the NUTRISHIELD project got involved in the European Researchers' Night 2021 which aims to bring research and researchers closer to the public (especially to young people) so that they can learn about their work and showcase the benefits it brings to society.

The Health Research Institute La Fe in Valencia (Spain) invited families from the neighborhood, to enjoy several workshops and lectures prepared by different departments.

With help of an incubator, baby dolls, and laboratory tools, the HULAFE team presented the NUTRISHIELD case study II.

They explained the special needs regarding nutrition of preterm infants admitted to the neonatal intensive care unit and highlighted the importance of human milk feeding.

Children had the opportunity to practice sample collection and storage of biological samples analysed within the study and got familiar with standard operational procedures currently carried out by clinical staff and researchers involved in the project.

An ideal opportunity to see science and society shaking hands for a better future for infant nutrition!

The NUTRISHIELD Analysers

HULAFE organizes the 1st course on mass spectrometry-based metabolomics focused on the field of neonatology and presents Case Study II of NUTRISHIELD.

HULAFE organized the 1st short course on mass spectrometry-based metabolomics 13-15 September 2021 focused on the field of neonatology. The event was held at The Health Research Institute La Fe in Valencia (Spain) with PhD and M.D. speakers and included both, lectures and case studies. The course was intended to be a meeting point for experiences, ideas, and know-how exchange between researchers with and without expertise in the field.

Hot topics such as the study design and fieldwork, preparation and analysis of samples, data analysis and processing, and visualization as well is interpretation of results were addressed.

Case study II of NUTRISHIELD project dealing with personalised nutrition of lactating mothers was presented as an example of curation in sample collection and storage when different sample type (e.g., urine, faeces, milk, etc.) from different enrolled participants (e.g., mother, infant) are involved. Data handling when several determinations are considered was also discussed. The attendees included not only post-doctoral researchers, but also highly motivated PhD students, with scarce background in metabolomic workflows, who found the course as an opportunity to gain knowledge in the field while expanding horizons in research, especially focusing on this atrisk population.

Issue 5 / October 2021

nutrishield

NUTRISHIELD at Metabolomics 2021

Metabolomics 2021 is the premier congress devoted to metabolism-based research. Its mission is to promote the growth and development of the field of metabolomics internationally, to provide the opportunity for collaboration and association among the workers in that science and to provide opportunities for presentation of research achievements and creation of workshops. It is primary organized by the Metabolomics Society, which has more than 1,000 members in more than 40 countries.

NUTRISHIELD participated in this event with two poster presentations entitled: "Characterization of human milk exosomes by Infrared Spectroscopy and LC-HRMS" and "Human milk oligosaccharide (HMO) screening in term and preterm human milk (HM) samples".

MULTI-BLOCK CHARACTERIZATION OF ISOLATED HUMAN MILK EXOSOMES BY INFRARED SPECTROSCOPY AND LIPIDOMICS

VICTORIA RAMOS GARCIA
NEONATAL RESEARCH GROUP – HEALTH RESEARCH INSTITUTE LA FE
VALENCIA, SPAIN

NUTRISHIELD at the Road to CAC 2022

Road to CAC 2022 is an online international conference that aims to bring together young researchers to exchange and share their experiences and research results on all aspects of Chemometrics in Analytical Chemistry. These last pandemic months with very limited number of events might have had a significant impact especially on them who may not have had any opportunity to profit from exchanges or from presenting their work to a wider audience so, in this congress, early-stage researchers only (PhD student or anyway within 4 years from MSc graduation) to present their work.

Our partner HULAFE represented NUTRISHIELD in this event by an oral presentation entitled "Multi-block characterization of isolated human milk exosomes by infrared spectroscopy and lipidomics" in which around 60 researchers attended.

More about our news and events here

Contact us

info@NUTRISHIELD-project.eu

Join us at :

Twitter
@NUTRISHIELD_eu

LinkedIn
NUTRISHIELDproject

Facebook
NUTRISHIELDproject

www.nutrishield-project.eu

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 818110.