

PROGRAMA DE INVESTIGACION DE LA RED SAMID II

NUEVA PROPUESTA DE LA ESTRUCTURA

(Acorde al formulario de la Evaluación del ISCIII)

Título del Programa: Prevención y tratamiento de los trastornos neurológicos, nutricionales y metabólicos desde la etapa prenatal hasta la adolescencia.

Objetivo 1	To study on IUGR biomarkers able to predict the postnatal development of disorders of ND and MS.
WP 1	PRENATAL RISK FACTORS FOR ABNORMAL NEURODEVELOPMENT AND NUTRITIONAL AND METABOLIC OUTCOME
Líderes	Dolores Gómez Roig - Elisa Llurba Olivé
Objetivos y Tareas	<i>Ver nota al final.</i>

Objetivo 2	To study early biochemical, biophysical and brain image biomarkers able to predict the postnatal development of disorders of ND <u>and</u> to identify risk factors of postnatal neurological development of children and evaluate the effectiveness of diagnostic methods on prevention and treatment.
WP 2	NEONATAL RISK FACTORS FOR IMPAIRED NEURODEVELOPMENT OUTCOME
Líderes	Fernando Cabañas Fernandez – Máximo Vento Torres
Objetivos y Tareas	<i>Ver nota al final.</i>
WP 4	POST-NEONATAL RISK FACTORS FOR IMPAIR NEURODEVELOPMENT OUTCOME
Líderes	Jesús López-Herce Cid
Objetivos y Tareas	<i>Ver nota al final.</i>

Objetivo 3	To study neonatal risk factors for adverse nutritional and metabolic outcomes and possible preventive nutritional strategies <u>and</u> to study risk factors for adverse nutritional and metabolic outcomes in early childhood and possible preventive interventional strategies.
WP 3	NEONATAL RISK FACTORS FOR ADVERSE NUTRITIONAL AND METABOLIC OUTCOME
Líderes	Carmen Rosa Pallás Alonso
Objetivos y Tareas	<i>Ver nota al final.</i>
WP 5	POST-NEONATAL: RISK FACTORS FOR NUTRITIONAL AND METABOLIC ADVERSE OUTCOME
Líderes	Luis Alberto Moreno Aznar – Concepción María Aguilera García
Objetivos y Tareas	<i>Ver nota al final.</i>

Objetivo 4	Research on prenatal and postnatal environmental factors related to neurological, nutritional and metabolic disorders from prenatal period to adolescence.
WP 6	EPIGENETIC, TOXIC AND ENVIRONMENTAL RISK FACTORS FOR ABNORMAL NEURODEVELOPMENTAL, NUTRITIONAL AND METABOLIC OUTCOME
Líderes	Oscar García Algar
Objetivos y Tareas	<i>Ver nota al final.</i>

Nota Importante: Revisar el planteamiento de cada objetivo específico en cada wp y de cada tarea. La crítica del evaluador del ISCIII fue algunos de los objetivos específicos de los WPs parecen más una tarea que un objetivo. Actualizar y revisar los objetivos y las tareas acorde a lo que somos capaces de realizar a día de hoy, ya que los que están son los que definimos antes de comenzar a andar en la nueva Red.

NEW OBJECTIVES OF THE RED SAMID

To fulfil our main **hypothesis**, that several perinatal/postnatal factors lead to neurologic, nutritional and metabolic disorders from prenatal period to adolescence and, that this, subsequently conditions a normal adult life health status, several objectives were defined and structured in 6 Work Packages. The study of some of this factors might contribute to its prevention.

The **Scientific Programme** proposed is planned to study some specific risk factors outlined in the hypothesis. More precisely, the operative scientific objectives are related to, 1) the factors causing brain injury and thus affecting neurodevelopment and 2) the early nutritional factors related to the latter development of the metabolic syndrome in preadolescent children.

To accomplish these two operative objectives, the research programme includes 6 Work Packages (WP) appropriately linked and coordinated. Each WP aims to a specific objective that will be analysed by a few specific tasks. For each task, an outcome will be produced, that could be measurable to assure the correct progression of the program. Moreover, a timetable and a list of key milestones will be established for similar proposes.

Each of the two main areas of the programme will be studied in a horizontal timeline, from the foetal stage to the adolescence as appropriate. So, prenatal, neonatal and post-neonatal WP will be set for each of the two main study lines, as indicated in the next paragraphs.

WP-1. PRENATAL RISK FACTORS FOR ABNORMAL NEURODEVELOPMENT (ND) AND NUTRITIONAL AND METABOLIC OUTCOME (NMO).

General objective. To study on IUGR biomarkers able to predict the postnatal development of disorders of ND and MS.

Specific objectives.

- 1.1 To establish a protocol for the diagnosis and obstetrical management of IUGR agreed by all centres, including the relationship between Doppler hemodynamic compromise of umbilical blood flow on latter alteration of the ND and NMO.
- 1.2 To study the interrelation between maternal and immediate perinatal risk factors, epidemiological complications, toxic, environmental and socio-economic variables, and the alteration/change in ND and NMO.
- 1.3 To develop a foetal model of IUGR, to study the factors affecting foetal growth and test possible preventive and therapeutic strategies.

WP-2 NEONATAL RISK FACTORS FOR IMPAIRED NEURODEVELOPMENT OUTCOME (ND).

General objective. To study early biochemical, biophysical and brain image biomarkers able to predict the postnatal development of disorders of ND.

Specific objectives.

- 2.1 To analyse the changes in the Redox status in foetal to neonatal transition, and the oxidative damage to membrane lipids, neuronal cell membranes, and the metabolic changes in relation to oxygen supplementation, hypoxia, hyperoxia or other factors (inflammation, infection, ventilation, etc.).
- 2.2 To study neonatal risk factor for brain injury and adverse ND in relation to cerebral oxygenation, transient cardiovascular instability and hypoxic-ischemic encephalopathy.
- 2.3 To developed and integrated data acquisition e-system to validate the development of algorithms to be use of early biomarkers of brain and cardiovascular dysfunction and to .establish animal models of neonatal hypoxic-isquemic brain injury.

ANEXO

WP-3 NEONATAL RISK FACTORS FOR ADVERSE NUTRITIONAL AND METABOLIC OUTCOME.

General objective. To study neonatal risk factors for adverse nutritional and metabolic outcomes and possible preventive nutritional strategies.

Specific outcomes.

3.1 Improve the nutritional and ND of premature infants by changing the diet with the intake of DHA of the breast milk, and the relative merits of fresh and pasteurized human milk, use of probiotics and high protein diet

3.2 To study the effect of nutritional status at discharge on body composition and glucose intolerance, and on later ND

WP-4. POST-NEONATAL RISK FACTORS FOR IMPAIR NEURODEVELOPMENT OUTCOME.

General objective. To identify risk factors of postnatal neurological development of children and evaluate the effectiveness of diagnostic methods on prevention and treatment.

Specific objectives:

4.1 To identify populations and postnatal risk factors for major ND impairment and neurological disorders in childhood (cardiac arrest, heart surgery, traumatic brain injury, stroke and poisoning)..

4.2. To study the usefulness of methods for early detection of risk factors of neurological disorder by neuroimaging -ultrasound, CT, MRI, PET-, cerebral blood flow and oxygenation, ECG and biochemical biomarkers and to study the efficacy of prevention and treatment methods to reduce neurological disorders.

4.3 To develop animal models of diagnosis, prevention and treatment of neurological diseases that occur in children with hypoxic neurological injury, ischemic neurologic injury and cardiac arrest.

WP-5. POST-NEONATAL: RISK FACTORS FOR NUTRITIONAL AND METABOLIC ADVERSE OUTCOME.

General objective. To study risk factors for adverse nutritional and metabolic outcomes in early childhood and possible preventive interventional strategies.

Specific objectives:

5.1 To investigate subclinical cardiovascular disease in children with perinatal developmental factors (IUGR or extreme low birth weight) that potentially influences the future risk of MAO to define non-invasive approaches to identify children with early changes in cardiovascular physiology that potentially affect future cardiovascular outcome for its potential applications and evaluate the biological effects of early interventions in the selected population.

5.2 To investigate the influence of genetic variants on the development of obesity and to evaluate the association between those genetic variants and food habits, physical activity and biomarkers of inflammation, cardiovascular diseases risk and oxidative stress.

WP-6: EPIGENETIC, TOXIC AND ENVIRONMENTAL RISK FACTORS FOR ABNORMAL NEURODEVELOPMENTAL, NUTRITIONAL AND METABOLIC OUTCOME.

General objective. Research on prenatal and postnatal environmental factors related to neurological, nutritional and metabolic disorders from prenatal period to adolescence.

Specific objectives.

6.1 Development of analytical methods to describe/validate biomarkers of prenatal and postnatal exposure to drugs abuse or prescription, organic toxics and heavy metals in different alternative matrices. Also, to study the prevalence of prenatal and postnatal exposure these substances on prospective and retrospective cohorts of neonates born in different regions of Spain, and to perform follow-up of the cohorts of prenatally exposed newborns.

6.2 To develop animal models of prenatal exposure to xenobiotics, mainly alcohol to define biomarkers of damage of different substances (parent substances and metabolites) to which foetus, newborn, child and adolescent can be exposed