SCHEDA RELAZIONE DOTTORANDI

Al collegio docenti del Dottorato in Medicina Molecolare

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Ciclo XXXIV Tutor Prof. Buonocore Giuseppe

Attività scientifica svolta nel 2° anno di Dottorato, Anno Accademico 2019/2020

PROGETTO DI RICERCA: "Il follow-up del neonato critico e benchmarking: il miglioramento della morbilità attraverso l'analisi critica dei dati perinatali"

ATTIVITÀ SCIENTIFICA

Relazioni a congressi

- Laschi Elisa (relatrice). *"Il ruolo dei biomarcatori nella pratica clinica neonatale: dal laboratorio al letto del malato"*. Relazione al congresso del Gruppo di Studio di Biochimica Clinica della Società Italiana di Neonatologia (SIN) "Novità dalla ricerca in biochimica clinica neonatale". Firenze, 16 Settembre 2020.

Abstract

- Elisa Laschi, Lucia Marseglia, Eloisa Gitto, Laura Cannavò, Maurizio Giordano, Annalaura Toni, Mariangela Longini, Giuseppe Buonocore, Serafina Perrone. *"La somministrazione di melatonina inibisce lo stress ossidativo nei nati pretermine."* Abstract sottomesso (per comunicazione orale) per il XXVI Congresso Nazionale della Società Italiana di Neonatologia - Il neonato al centro del futuro - Venezia; 7-10 Ottobre.

Articoli originali editi su riviste internazionali con IF

- Perrone S., Laschi E., Buonocore G. *Biomarkers of oxidative stress in the fetus and in the newborn.* Free Radic Biol Med. 2019 Oct; 142:23-31. doi: 10.1016/j.freeradbiomed.2019.03.034. (IF 6.170)

  Abstract: The dynamic field of perinatology entails ever-increasing search for molecular mechanisms of neonatal diseases, especially in the domain of fetal growth and neurodevelopmental outcome. There is an urgent need for new molecular biomarkers, to early identify newborn at high risk for developing diseases and to provide new treatment targets. The interest in biomarkers of oxidative stress in perinatal period have begun to grow in the last century, when it was evidenced the importance of the free radicals generation underlying the various disease conditions. To date, interesting researches have been carried out, representing milestones for implementation of oxidative stress biomarkers in perinatal medicine. Use of a panel of "oxidative stress biomarkers", particularly non protein bound iron, advanced oxidative protein products and isoprostanes, may provide valuable information regarding functional pathways underlying free radical mediated diseases of newborns and their early identification and prevention. Here, we will review recent advances and the current knowledge on the application of biomarkers of oxidative stress in neonatal/perinatal medicine including novel biomarker discovery, defining yet unrecognized biologic therapeutic targets, and linking of oxidative stress biomarkers to relevant standard indices and long-term outcomes.

- Perrone S., Laschi E., De Bernardo G., Giordano M., Vanacore F., Tassini M., Calderisi M., Toni A.L., Buonocore G., Longini M. *Newborn metabolomic profile mirrors that of mother in pregnancy.* Med Hypotheses. 2019 Dec 27; 137:109543. doi: 10.1016/j.mehy.2019.109543. (IF 1.375)

  Abstract:
  Background: Pregnancy is characterized by multiple metabolic processes to allow proper foetal development and ensure adequate stores. Little is known about the interactions between maternal and foetal metabolism during the last phase of pregnancy. Metabolomic offers potential to discover changes in maternal metabolism in pregnancy and their relation to the newborn metabolic status.
  Objective: In this study we tested the hypothesis that metabolomic status in newborns at birth depends upon the metabolomic profile of their mothers in the last phase of pregnancy.
  Study design: Urine samples were collected from 36 pregnant women three weeks before delivery and from 21 healthy term newborns within 48 h after birth. Urines were analysed using proton nuclear magnetic resonance (1H NMR) spectroscopy and NMR urine spectra were evaluated through Principal Components Analysis.

Results: The first component of the PCA analysis showed two distinct metabolic groups: pregnant women and newborns. A significant correlation was found between urine metabolic profiles of newborns and those of their mothers.
Conclusion: Urine metabolomic profiles of newborns at birth mirrors that of their mothers in the last phase of pregnancy. The metabolomic approach appears to be crucial to understand the maternal effects on foetal programming and infant outcomes.

- Perrone S., Laschi E., Buonocore G. *Oxidative stress biomarkers in the perinatal period: diagnostic and prognostic value.* Semin Fetal Neonatal Med. 2020 Apr; 25(2):101087. doi: 10.1016/j.siny.2020.101087. (IF 3.540)

Abstract: Perinatal oxidative stress (OS) is involved in the physiopathology of many pregnancy-related disorders and is largely responsible for cellular, tissue and organ damage that occur in the perinatal period especially in preterm infants, leading to the so-called "free-radicals related diseases of the newborn". Reliable biomarkers of lipid, protein, DNA oxidation and antioxidant power in the perinatal period have been demonstrated to show specificity for the disease, to have prognostic power or to correlate with disease activity. Yet potential clinical applications of oxidative stress biomarkers in neonatology are still under study. Overcoming the technical and economic difficulties that preclude the use of OS biomarkers in the clinical practice is a challenge that needs to be overcome to identify high-risk subjects and to predict their short- and long-term outcome. Cord blood, urine and saliva represent valid and ethically acceptable biological samples for investigations in the perinatal period.

- Perrone S, Laschi E, Negro S, Tei M, Urilli D, Buonocore G. *Personality, emotional and cognitive functions in young adults born preterm.* Brain Dev. 2020 Jul 8:S0387-7604(20)30178-9. doi: 10.1016/j.braindev.2020.06.014. (IF 1.504)

Abstract:
Background: Survival of preterm very low birthweight infants resulted in high risk for developmental cognitive deficits, poor academic achievement, and behaviour disorders. While numerous studies evaluated the prevalence of neurodevelopmental disability in early childhood, poor literature is available for infants born very low birthweight in adulthood.
Materials and methods: Fifty-five young adults born preterm (mean age: 18 ± 2.42 years; <33 weeks of gestational age and/or with birth weight <1500 g) were enrolled. The Verbal Intelligence Quotient (vIQ), Performance Intelligence Quotient (pIQ) and Total Intelligence Quotient (tIQ) were assessed through the Wechsler Adult Intelligence Scale – Revised (WAIS-R). Personality profiles were investigated using Rorschach test. Both WAIS-R and Rorschach scores were subsequently compared to 13 matched controls born at term. Data were analysed with the SPSS v20 for Windows statistical package.
Results: Young adults born preterm showed lower IQ scores than young adults born at term: tIQ 90.95 ± 22.46 versus 108.77 ± 16.14, p = 0.006; vIQ 89.85 ± 21.85 versus 107.69 ± 18.33, p = 0.009, and pIQ 92.40 ± 22.90 versus 108.31 ± 14.52, p = 0.011. No differences emerged in personality profile as most subjects showed adequate internal resources in both groups, but a trend towards anxiety and insecurity were identified in young adult born preterm.
Conclusions: Young adults born preterm show psychological fragility and lower cognitive pattern than young adults born at term. Data support the need of an early psychological intervention that could help these individuals at greater risk to face a young society that is changing and that necessarily requires stronger internal resources.

ATTIVITÀ FORMATIVA

Partecipazione a corsi/congressi e webinar

1. Incontro di lavoro tra operatori della ReBLUD. Firenze, 06/02/2020.
2. Webinar "Covid-19: come si insegue e sconfigge un virus". 29/05/2020 (Webinar aperto esclusivamente a laureandi e dottorandi organizzato dal Dipartimento di Bioscienze dell'Università di Milano e dal Centro UniStem).
3. Webinar "Pandemia daSARS-COV-2: aspetti virali epidemiologici, clinici, immunologici e terapeutici". 04/06/2020 (meeting online organizzato dall'Accademia Medica di Roma).
4. Webinar "Attaccamento e allattamento" (Dr.ssa Bortolotti). 10/06/2020.
5. Webinar "Kawasaki al tempo del COVID19". 18/06/2020 (organizzato da Pharmaguida, responsabile scientifico Dott. Luigi Martemucci; crediti ECM 3.3).
6. Congresso del Gruppo di Studio di Biochimica Clinica della Società Italiana di Neonatologia (SIN) "Novità dalla ricerca in biochimica clinica neonatale". Firenze, 16 Settembre 2020.