Proceedings of the 69th Congress of the Italian Embryological Group-Italian Society of Development and Cell Biology (GEI-SIBSC)

11-14 June 2024

Jointly organised by
University of Naples Federico II,
University of Naples "Parthenope"
University of Campania "Luigi Vanvitelli"

The conference will take place in Naples on 11-14 June 2024 at the two historical venues: Complex of Saints Marcellinus and Festus, in the Historic Centre, and Villa Doria D'Angri, on the Posillipo hill.

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European Journal of Histochemistry
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The *European Journal of Histochemistry* was founded in 1954 by Maffo Vialli and published till 1979 under the title of *Rivista di Istochimica Normale e Patologica*, from 1980 to 1990 as *Basic and Applied Histochemistry* and in 1991 as *European Journal of Basic and Applied Histochemistry*. It is now published under the auspices of the University of Pavia, Italy.
The *European Journal of Histochemistry* is the official organ of the Italian Society of Histochemistry and a member of the journal subcommittee of the International Federation of Societies for Histochemistry and Cytochemistry (IFSHC), and has been an influential cytology journal for over 60 years, publishing research articles on functional cytology and histology in animals and plants.

The Journal publishes Original Papers, Technical Reports, Reviews, Brief Reports, Letters to the Editor, Views and Comments, and Book Reviews concerning investigations by histochemical and immunohistochemical methods, and performed with the aid of light, super-resolution and electron microscopy, cytometry and imaging techniques; attention is also given to articles on newly developed or originally applied histochemical and microscopical techniques.

Coverage extends to:
- functional cell and tissue biology in animals and plants;
- cell differentiation and death;
- cell-cell interaction and molecular trafficking;
- biology of cell development and senescence;
- nerve and muscle cell biology;
- cellular basis of diseases.

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perature into biological tissues. Many factors influence the therapeutic effects of heat treatment timing, repetition, and pulsing. Several studies suggest heat-based therapies for cancer treatment and for regenerative medicine to enhance wound healing and tissue regeneration. Photothermal agents, as gold nanoparticles (AuNPs), have been used as nano-hotspot to selectively generate heat in a spatiotemporal fashion (photothermal therapy)[1]. Cnidarians are excellent model organisms for studying tissue regeneration, thanks to their ability to regenerate missing body parts. The effects induced by heat and light irradiation on *Hydra vulgaris* have been recently investigated[2-3], opening interesting scenario on the possibility to develop new nanodevices to enhance their regenerative potential. AuNPs, due to plasmonic features, can release precise heat doses under nir-infrared irradiation (NIR) and in *Hydra* they have been shown able to induce diverse responses[4], ranging from cell ablation to programmed cell death or thermo tolerance, by simply tuning NP shape, size and their thermal properties. Tuning NIR irradiation and AuNPs dose, treated polyps capability to regenerate missing heads under photostimulation has been dissected at whole animal, cellular and molecular levels, and compared to exposure to external macroscopic heat sources, suggesting new application of hyperthermia mediated by AuNPs to enhance tissue regeneration[5]. Results reveal the action of heat on animal physiology and open new perspectives for the development of technologies based on hyperthermia for regenerative medicine.

References

1. Cao-Milán R et al. Expert Opin Drug Deliv 2014;11:741–52.
2. Ambrosone A et al. Nanomedicine 2014;9(13):1913-22.
3. Moros M et al. Nanomedicine 2015;10(14):2167-83.
4. Moros M et al. ACS Appl Mater Interfaces 2020;12:13718–30.
5. Dell'Aversano N et al. (Submitted March 2024)

THE MEDICINAL LEECH *HIRUDO VERBANA* AS INNOVATIVE INVERTEBRATE MODEL TO INVESTIGATE THE REGENERATIVE POTENTIAL OF HUMAN MESENCHYMAL STEM CELLS SOLUBLE FACTORS

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Although various sophisticated approaches have been developed to mimic multicellular interactions in three-dimensional systems, they still fail to faithfully replicate an entire living organism. Therefore, in accordance to the European (2010/63/EU) and Italian (26/2014) Directives, the use of alternative animal models has become a fundamental step in providing useful information in several research fields. In this context, the medicinal leech *Hirudo verbana*, due to the lack of ethical restrictions associated with *in vivo* research, is starting to show promise as complementary model for pre-clinical biomedical studies[1]. Indeed, despite their simple body organization and the relatively low genetic complexity, leeches exhibit biological processes, cellular responses, and tissue organization extremely similar to those found in vertebrates[2,3]. Considering the aforementioned, in the current work we propose to use medicinal leeches to investigate the potential of soluble factors released from human Mesenchymal Stem Cells (hMSCs). Morphological, immunohistochemical, and molecular analyses have been performed on injured animals to assess the promotion of cellular invasion and vessel growth. Both of these processes are crucial for ensuring adequate vascularization, necessary for cell survival, and tissue regeneration, preventing the formation of hypertrophic scars. Our results confirmed an improved ability in restoring injured tissues and a significant reduction of healing time[4,5] in animals treated with hMSCs soluble factors, thus confirming this cell-free approach as a novel solution for the treatment of multiple chronic diseases.

References

1. Cao-Milán R et al. Expert Opin Drug Deliv 2014;11:741–52.
2. Ambrosone A et al. Nanomedicine 2014;9(13):1913-22.
3. Moros M et al. Nanomedicine 2015;10(14):2167-83.
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R-FETAX: TERATOGENIC AND NEUROBEHAVIORAL EFFECTS OF ETHANOL

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Ethanol (Eth) consumption in pregnancy is correlated to a wide spectrum of effects, classified as Fetal Alcohol Spectrum Disorders (FASD), including morphological defects, developmental delays and neurobehavioral effects both in humans and in experimental species. High Eth concentrations (0.6-3% v/v) induced in amphibian *Xenopus laevis* exposed from midblastula to not feeding tadpole (FETAX protocol) malformations and lethal effects. Aim of the present work was the evaluation of multiple morphological and neurobehavioral effects of Eth exposure (Eth 0.1-3% v/v) using R-FETAX protocol. Samples, obtained by natural mating, were exposed during different specific developmental windows (organogenetic period, sensitive for morphological abnormalities; neurodevelopmental windows, sensitive to behavioral alterations). Extra groups, exposed during the whole test (classical FETAX exposure) or for 4 h before the end of the test (acute exposure) were performed. Samples were monitored for lethal effects during the full six-day test period. At the end of the test, external morphology and developmental degree were evaluated. The neurobehavioral swimming test was applied only on not-malformed tadpoles. Effects were modelled using PROAST software: dose-relation curves were obtained and benchmark dose level derived, setting response at levels used as point of departure for risk assessment. Overall data showed dose- and stage- specific effects miming the Eth-induced effects observed in humans, suggesting no safe amount of alcohol use during development.