

SECOND SOUTHERN SCIENCE CONFERENCE: SESSÕES DE SAÚDE

SECOND SOUTHERN SCIENCE CONFERENCE: HEALTH SESSIONS

Dr. Cristián A. Quintero^{1,2,3}

¹Universidad Juan Agustín Maza, BioCyM, Facultad de Farmacia y Bioquímica, Mendoza, Argentina.

²Universidad de Mendoza, INBIOMED, Facultad de Ciencias Médicas, Mendoza, Argentina

³Chair of the Second Southern Science Conference

* Corresponding author
e-mail: cristian.quintero@um.edu.ar

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RESUMO

A Segunda Conferência Científica do Sul reuniu pesquisadores internacionais focados em saúde e doenças. O evento contou com palestras de especialistas em diversas áreas, incluindo biologia celular, neurobiologia, imunologia e farmacologia. Destacaram-se apresentações sobre novas ferramentas para pesquisa em biologia celular, como o sistema RUSH e RUCH, que permitem estudar o tráfego de proteínas nas células. Na área de microbiologia, foram discutidos temas importantes como resistência a antibióticos e infecções bacterianas e virais. Em neurobiologia, os pesquisadores apresentaram avanços no tratamento de doenças neurodegenerativas, incluindo o uso de nanopartículas para transporte de medicamentos. A conferência também abordou questões de imunologia, como os efeitos da vacinação contra COVID-19, e aspectos da dieta na fisiologia celular. O evento concluiu com uma palestra sobre empreendedorismo acadêmico, demonstrando como pesquisas podem ser transformadas em produtos comerciais. A conferência, sediada na Universidad de Mendoza, proporcionou uma oportunidade única para compartilhamento de conhecimentos e avanços científicos na área da saúde, com a próxima edição programada para 2026.

Palavras-chave: *biologia celular, neurobiologia, imunologia, saúde, doença*

ABSTRACT

The Second Southern Science Conference brought together international researchers focused on health and diseases. The event featured expert lectures across various fields, including cell biology, neurobiology, immunology, and pharmacology. Notable presentations covered new tools for cell biology research, such as the RUSH and RUCH systems, which enable studying protein trafficking in cells. In microbiology, key topics included antibiotic resistance and bacterial and viral infections. In neurobiology, researchers presented advances in treating neurodegenerative diseases, including the use of nanoparticles for drug delivery. The conference also addressed immunology issues, such as COVID-19 vaccination effects, and aspects of diet in cell physiology. The event concluded with a lecture on academic entrepreneurship, demonstrating how research can be transformed into commercial products. The conference, hosted at the Universidad de Mendoza, provided a unique opportunity for sharing scientific knowledge and advances in healthcare, with the next edition scheduled for 2026.

Keywords: *cell biology, neurobiology, immunology, health, disease*



Dr. Cristián Andrés Quintero

Research is not completed until it is communicated. The Southern Science Conference is a multidisciplinary conference conducted by researchers worldwide. Among these large areas, I will focus on health research.

For the opening ceremony, we received Dr. Franck Perez from the Institute of Curie, France. Their talk centered on tools for cell biology research. After the development of the retention using selective hooks (RUSH) system, a tool useful for synchronization of secretory protein traffic (1), which allows the anchoring of a protein to the Endoplasmic Reticulum and releasing it just by adding biotin, they improved it with the retention using CATCHFIRE hooks (RUCH) system (2), which is reversible, and allows the researcher to investigate with precision the trafficking of their protein of interest, their localization, organelle transport, and cellular processes. Continuing with cell biology, Dr. Andrew Lindsay, from the University College Cork, showed the important role of endosomal recycling pathways in cancer development. Through a systematic computational analysis, they found evidence that endosomal recycling pathways are implicated in glioblastoma nature (3). Even more, they showed the effect of the endosomal recycling inhibition is

also able to downregulate estrogen receptor-alpha, and in parallel, synergize with endocrine therapies (4). The third talk in the area was in charge of Dr. Melina Musri from the Mercedes and Martin Ferreyra Medical Research Institute, Córdoba, Argentina, where she showed how the smooth muscle cell (SMC) phenotypic plasticity is regulated by the m6A reader YTHDF2 and DAGAR. They found a new Long non-coding RNA (lncRNA), and they called it Differentiation And Growth Arrest-Related lncRNA (DAGAR). The group showed DAGAR expression is fundamental for SMC quiescence and its knockdown hinders SMC differentiation. DAGAR interacts with several proteins, involved in important processes such as cytoskeleton organization, cell cycle, and iron metabolism, among others, highlighting the crucial role of DAGAR (5).

Microbiology is one of the sub-areas with the highest number of presentations. Ramon Loureiro Pimenta from Universidade Federal Rural do Rio de Janeiro-Brasil talked about how the legislation (or the lack of legislation) can negatively impact human health. The results over the years showed an increase in the antibiotic resistance of several bacteria after the overuse of antibiotics in poultry. By using metabolomics, they found more than 100 antibiotic resistance genes in the bacteria investigated, that could allow the resistance to 14 pharmacological classes relevant in the human and veterinary clinical contexts (6). Antibiotic resistance is a key public health issue, as highlighted by Dr. Carolina Touz from the Mercedes and Martin Ferreyra Medical Research Institute, Córdoba, Argentina. She demonstrated the role of exosome-like vesicles as Vectors of Metronidazole Resistance in *Giardia lamblia*, demonstrating the mechanisms at the genotype level. They also found differences in the RNA content in the exosome-like Vesicles, specifically on different assemblages that can infect human or hoofed animals. This could explain the host specificity of the parasite (7). We also listened to how bacterial and viral infections can alter the normal functioning of cells, as in the case of HPV and *Chlamydia trachomatis* infections, which mediate the quality of sperm and affect male

fertility. Analyzing male partners in couples with infertility, their studies showed a high prevalence of HPV urogenital infection among male partners of infertile couples, and that HPV and *C. trachomatis* infections are reciprocal risk factors for their co-infection. This association is also linked to impaired sperm quality, oxidative stress, and inflammation (8). Some pathogens are microscopic and macroscopic and can reach a few meters in length and live in our bodies, such as *Diphyllobothrium* spp. Commonly, they are transmitted by eating raw fish, and they are endemic. Dr. Sergio Bontti from Instituto Coni/ Universidad de Mendoza, Mendoza, Argentina, showed a 3 years study where their team found several cases of Diphyllobothriosis in Mendoza, a non-endemic area, with all of them related to the consumption of raw fish from lakes at the Patagonia Argentina. In this time frame, they found and characterized 26 worms, 21 morphologically and 5 through molecular biology (9).

Neurobiology in health and disease was presented in five talks. Dr. Daniela Quinteros from Facultad de Ciencias Químicas-UNC/UNITEFA, Córdoba, Argentina demonstrated the properties and advantages of using melatonin carrier systems for neuroprotection to treat ocular neurodegenerative pathologies, specifically using a retinal degeneration model. They described a new technique to transport insoluble drugs like melatonin in human serum albumin-based nanoparticles, being a promising vehicle for treatments of neurodegenerative eye diseases (10). Neurodegeneration was also approached by Dr. Anahí Bignante from Facultad de Ciencias Químicas-UNC/CIQUIBIC, Córdoba, who showed their advances in using Gallein-Loaded Nanoparticles of Human Albumin to avoid the Toxic Effects of A β in In Vitro Models of Alzheimer's disease. In collaboration with Daniela Quinteros, they designed a novel method to evaluate the effectiveness of the nanoparticle synthesis process and the efficiency of drug encapsulation within the nanosystem (11). Neurosteroids were assessed in two different talks, in both cases working on signaling, and Dr. Ricardo Cabrera-INBIOMED-UM, Mendoza, Argentina, showed how these molecules play an important role as neuromodulators of neuronal

systems in neurodegeneration. It is noteworthy that these results are in the process of publication. In the second talk, Dr. Myriam Laconi-IMBECU-Mendoza showed their function not only in the brain but also in the ovary. Importantly, their results suggest allopregnanolone administration could improve fertility and oocyte quality (12). Finally, Dr. Valeria Zarelli from Universidad JA Maza, Mendoza, Argentina, described the role of KCTD15 in neural crest development. The Potassium Channel Tetramerization Domain containing 15 was shown as an important factor in regulation not just in the neural crest formation, but also in other important steps of embryonic development (13).

When we attended presentations in pharmacology, we found two different approaches. Dr. Mariana Vallejo- UNITEFA-Córdoba performed an interesting multivariate analysis of chemical and biological data to identify bioactive compounds in native plants. Dr. Patricia Romano-IHEM-Mendoza is working on known drugs, trying to find an effective drug Repurposing for Neglected Diseases, using as a model Chagas's disease and the treatment of the *Trypanosoma cruzi*. Both researchers presented original results, before their publication.

It is well known that the last epidemic disease was caused by a virus, the SarsCoV2, causing COVID. Immunization has come in different approaches, using attenuated viral proteins or mRNA-based vaccines. Dr. Peter Andrew McCullough, USA, showed a strong correlation with myocarditis augmentation, specifically in vaccinated patients(14).

Immunology was presented in the talk of Dr. Juan Pablo Mackern-IMBECU-Mendoza, who presented the immune function of Desmoglein-4. While the underlying mechanisms remain unclear, these findings indicate that the absence of desmoglein-4 could play a role in the progression of immune-mediated skin diseases by facilitating leukocyte recruitment to the skin (15).

Diet is important at many levels, including those that are less expected, as in sperm cell physiology. It is well known that A hypercholesterolemic diet affects negatively the

normal sperm cell physiology. Dr. Miguel Fornes-IHEM-Mendoza, showed that by adding olive oil to the diet, the normal physiology of these cells could be recovered (16).

At the end of the event, we received an interesting remainder: we could conduct business from our laboratories to the world. Dr. Lívio César Cunha Nunes. Brazil demonstrated successful projects borne by the academy and reached large markets. Their talk was a pathway from the idea to the market, where Academic Entrepreneurship is a reality and can be achieved.

The Second Southern Science Conference was a unique opportunity for the host university, Universidad de Mendoza. We were luxury spectators and participants in high-quality talks, with an emphasis on health and diseases. We are waiting for the next edition, in 2026.

Bibliography

1. Boncompain G, Divoux S, Gareil N, de Forges H, Lescure A, Latreche L, et al. Synchronization of secretory protein traffic in populations of cells. *Nat Methods* [Internet]. 2012 May [cited 2013 Sep 25];9(5):493–8. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/22406856>
2. Bottone S, Joliot O, Cakil ZV, El Hajji L, Rakotoarison LM, Boncompain G, et al. A fluorogenic chemically induced dimerization technology for controlling, imaging and sensing protein proximity. *Nat Methods*. 2023;20(10):1553–62.
3. Joyce LJ, Lindsay AJ. A systematic computational analysis of the endosomal recycling pathway in glioblastoma. *Biochem Biophys Reports* [Internet]. 2024;38(March):101700. Available from: <https://doi.org/10.1016/j.bbrep.2024.101700>
4. Fletcher KA, Alkurashi MH, Lindsay AJ. Endosomal recycling inhibitors downregulate estrogen receptor-alpha and synergise with endocrine therapies. *Breast Cancer Res Treat* [Internet]. 2024;204(3):631–42. Available from: <https://doi.org/10.1007/s10549-023-07225-2>
5. de la Cruz-Thea B, Natali L, Ho-Xuan H, Bruckmann A, Coll-Bonfill N, Strieder N, et al. Differentiation and Growth-Arrest-Related lncRNA (DAGAR): Initial Characterization in Human Smooth Muscle and Fibroblast Cells. *Int J Mol Sci*. 2024;25(17):9497.
6. de Farias BO, Saggiaro EM, Montenegro KS, Magaldi M, Santos HSO, Gonçalves-Brito AS, et al. Metagenomic insights into plasmid-mediated antimicrobial resistance in poultry slaughterhouse wastewater: antibiotics occurrence and genetic markers. *Environ Sci Pollut Res* [Internet]. 2024;31(51):60880–94. Available from: <https://doi.org/10.1007/s11356-024-35287-2>
7. Natali L, Luna Pizarro G, Moyano S, de la Cruz-Thea B, Musso J, Rópolo AS, et al. The Exosome-like Vesicles of Giardia Assemblages A, B, and E Are Involved in the Delivering of Distinct Small RNA from Parasite to Parasite. *Int J Mol Sci*. 2023;24(11).
8. Olivera C, Mosmann JP, Paira DA, Molina RI, Tissera AD, Motrich RD, et al. Association between Human Papillomavirus and Chlamydia trachomatis genital infections in male partners of infertile couples. *Sci Rep* [Internet]. 2021;11(1):1–9. Available from: <https://doi.org/10.1038/s41598-021-99279-9>
9. Semenas L, Arbetman M, Viozzi G, Gentiluomo J, Bontti S. Human diphyllbothriasis in Argentina: assessing the epidemiological significance from historical records and reports of new cases. *Parasitol Res* [Internet]. 2024;123(5). Available from: <https://doi.org/10.1007/s00436-024-08220-2>
10. Mickaela Martinez S, Inda A, Marina Garcia A, María Bermúdez J, Emilio Gonzo E, Herrero-Vanrell R, et al. Development of melatonin-loaded, human-serum-albumin nanoparticles formulations using different methods of preparation for ophthalmic administration. *Int J Pharm*. 2022 Nov 25;628:122308.

11. Inda A, Tettamanti CS, Martinez SM, Bignante EA, Allemandi DA, Quinteros DA. New RP-HPLC method for the simultaneous determination of process yield and percentage of encapsulation of Gallein in albumin nanoparticles. *J Chromatogr B*. 2024 Jun 1;1240:124161.
12. Cáceres ARR, Cardone DA, Sanhueza M de los A, Bosch IM, Cuello-Carrión FD, Rodríguez GB, et al. Local effect of allopregnanolone in rat ovarian steroidogenesis, follicular and corpora lutea development. *Sci Rep* [Internet]. 2024;14(1):1–19. Available from: <https://doi.org/10.1038/s41598-024-57102-1>
13. Cabrera R. Para-Chlorophenyl Alanine Induces Aggressive Behavior by Serotonin Depletion in Male Rats and Increases Tryptophan Hydroxylase two and GABAA $\alpha 1$ mRNA Expression in the Olfactory Bulb. *Am J Biomed Sci Res*. 2023;18(6):556–64.
14. Hulscher N, Hodkinson R, Makis W, McCullough PA. Autopsy findings in cases of fatal COVID-19 vaccine-induced myocarditis. *ESC Hear Fail*. 2024;2.
15. Moreno-Sosa T, Sánchez MB, Pietrobon EO, Fernandez-Muñoz JM, Zoppino FCM, Neira FJ, et al. Desmoglein-4 Deficiency Exacerbates Psoriasiform Dermatitis in Rats While Psoriasis Patients Displayed a Decreased Gene Expression of DSG4. *Front Immunol*. 2021;12(April):1–10.
16. Funes AK, Avena MV, Ibañez J, Simón L, Ituarte L, Colombo R, et al. Extra-virgin olive oil ameliorates high-fat diet-induced seminal and testicular disorders by modulating the cholesterol pathway. *Andrology*. 2023;11(6):1203–17.

DECLARATIONS

1. Limitations:

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Conference invitation. (now related to the interview)

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