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Editorial

Nucleosides, Nucleotides and Nucleic Acids as Therapeutics: A Virtual Special Issue

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Nucleosides and nucleotides are the building blocks of life. Through phosphorylation and polymerization, these building blocks are transformed into nucleic acids, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). DNA, of course, plays the critical tasks of carrying and serving as a template for our genetic information. RNA, on the other hand, is multifunctional, serving as a template for protein synthesis, in addition to performing non-canonical roles in transcriptional regulation, splicing, translational regulation, and catalysis through the work of noncoding RNAs. Nucleotides on their own also carry out key cellular activities, serving as secondary messengers in signaling cascades. Combined, nucleosides, nucleotides, and nucleic acids are paramount to life.

Based on the centrality of nucleosides, nucleotides, and nucleic acids for human biology, nucleic acid metabolism and activity have provided key mechanisms by which to manipulate human health in times of disease. The Nobel Prize winning work of Gertrude Elion and George Hitchings in the rational design of nucleoside-based therapeutics set the foundation for this class of small molecule drugs that now serve as pivotal medicines for the treatment of cancer, viral disorders, and immunosuppression, among others.[1−3] The discovery of RNA interference (RNAi), which also was awarded a Nobel Prize, has recently begun to transform the treatment of human diseases through the use of small interfering RNAs (siRNAs) as therapeutics.[4] Relatedly, antisense oligonucleotides (ASOs) are now coming of age, playing a vital role in our arsenal of combatting ailments in patients with both rare and more common diseases.[5] While ASOs and siRNAs are nucleic acid therapies of small size, this past year, we have seen the power of large messenger RNAs (mRNAs) as therapeutics with the ground-breaking COVID-19 vaccines developed by Moderna and BioNTech-Pfizer.[6] Finally, CRISPR (clustered regularly interspaced short palindromic repeats), awarded the Nobel Prize in Chemistry in 2020 for the work of Emmanuelle Charpentier and Jennifer Doudna, is paving the way toward our ability to use gene editing for curing human diseases.[7]

To highlight the broad impact that nucleosides, nucleotides, and nucleic acids have in drug discovery and molecular pharmacology, *ACS Pharmacology and Translational Science* is excited to publish a virtual special issue dedicated to this important area in 2022. As an incoming Topic Editor, I encourage you to submit your manuscripts at https://acsparagonplus.acs.org by August 31, 2022. Please select "Nucleosides, Nucleotides and Nucleic Acids as Therapeutics" from the special issue dropdown box in the ACS Paragon Plus submission system. We are seeking submissions representing all manuscript types, including Letters, Articles, Reviews, Perspectives, Drug Discovery Stories, and Viewpoints, describing work in the larger field of nucleoside-, nucleotide-, and nucleic acid-based drug discovery and development. For more information about the journal scope and manuscript types, please review the Author Guidelines: https://pubs.acs.org/paragonplus/submission/aptsfn/aptsfn_authguide.pdf.[8] All manuscripts will proceed through the standard *ACS Pharmacology and Translational Science* rigorous review and editorial process. Because this will be a virtual special issue, articles will be placed into a regular journal issue immediately following acceptance. Once all articles have been accepted, they will be collected on their own web page to provide enhanced exposure to each author's work and the field.

I look forward to celebrating this area of drug discovery and development through this issue and learning more about contemporary advances being made in the field.

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Notes

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