Antiviral Chemistry and Chemotherapy
2018, Vol. 26: 1
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DOI: 10.1177/2040206618781410
journals.sagepub.com/home/avc
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Advances in antiviral nucleoside analogues and their prodrugs

Katherine Seley-Radtke[1] and Jerome Deval[2]

This special collection is dedicated to the late Professor Chris McGuigan who devoted his career to the advancement of nucleoside analogues and their prodrugs. In that regard, nucleosides have played a significant role in antiviral research for decades since a number of life-threatening human infections are caused by DNA and RNA viruses. This issue reviews some of the recent strategies employed to discover and optimize nucleoside analogues and their prodrugs not only against chronic viral infections such as HIV, HBV, and HCV but also against acute infections caused by dengue, zika, Ebola, norovirus, RSV, and coronaviruses, as well as cancers.

For example, Prof. Chris Meier is one of the foremost experts in the development of nucleoside and nucleotide prodrug strategies. His paper "Nucleoside diphosphate and triphosphate prodrugs – an unsolvable task?" explores the challenges of developing prodrugs beyond the normal monophosphate stage, which, heretofore has been a lofty goal. Related to the subject of prodrugs, in their paper titled "Phosphoramidates and phosphonamidates (ProTides) with antiviral activity" Magdalena Slusarczyk et al. focus on new uses for the widely used ProTide technology invented by Chris McGuigan.

Some of the newer infectious diseases that are currently in the news are covered in the review by Ludek Eyer et al. in "Nucleoside analogues as a rich source of antiviral agents active against arthropod-borne flaviviruses," while Cyril Dousson's article "Current and future use of nucleo(s)tide prodrugs in the treatment of hepatitis C infections," focuses on unarguably the most widely studied flavivirus, HCV. Jerome Deval's paper "Nucleosides for the treatment of respiratory RNA viruses" reports on new drugs to treat various respiratory infections. Related to this, Katherine Seley-Radtke's paper details the history of the "fleximer" nucleoside approach, which has led to nucleosides that have exhibited potent activity against both respiratory infections such as SARS and MERS, as well as flaviviruses such as Zika and Dengue, in addition to Ebola.

Finally, Joy Feng's article "Addressing the selectivity and toxicity of antiviral nucleosides" wraps up the series by detailing the efforts of researchers to overcome issues with mitochondrial and other types of toxicity related to the problems of selectivity for many nucleoside drugs. In short, we hope you enjoy these reviews that we feel represent many of the areas related to nucleoside and nucleotide drug design and development that Chris spent his life pursuing.

ORCID iD

Katherine Seley-Radtke http://orcid.org/0000-0002-0154-3459

[1]University of Maryland, Baltimore, MD, USA
[2]Alios BioPharma, South San Francisco, CA, USA

Corresponding author:
Katherine Seley-Radtke, University of Maryland, Baltimore County (UMBC), 1000 Hilltop Circle, MEYR 405C, Baltimore, MD 21250, USA.
Email: kseley@umbc.edu

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