NUCLEIC ACID INSIGHTS

Meet the

Nucleic Acids Insights Editorial Board

What are your top predictions for the next five years in the nucleic acids field?

An integral part of the team that brings you *Nucleic Acid Insights* is our fantastic Editorial Advisory Board. This article is part of our 'Meet the EAB' series, created to showcase the leaders in the field who provide their time and expertise to help to steer the scope and focus of the journal. Here, members of our board share their top predictions for the field in the coming years.

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Jian Yan, Vice President, Research and Discovery, Geneos Therapeutics

I expect major breakthroughs in nucleic acids-based cancer vaccine development. Probably, we will see a few approvals of nucleic acid therapies to either prevent disease recurrence or treat cancer patients.

Piotr Kowalski, Associate Professor in Advanced Therapies, School of Pharmacy, University College Cork, and a Funded Investigator at APC Microbiome Ireland

I hope to see improvements in our understanding of nanoparticle organ tropism (protein corona formation), machine learning for formulation/biomaterial development, engineering novel synthetic RNA payloads (circRNAs, saRNAs), and oral delivery of RNA payloads. I also predict a resurgence of targeted nanoparticles (first clinical approval of targeted RNA/CRISPR LNP formulation), and to see novel types of non-viral delivery systems (non-ionizable-lipid based). Finally, I hope to see positive data from the first *in vivo* CAR-T clinical trials.

Jim Weterings, VP, Head of Oligonucleotide Therapeutics,
Bonito Biosciences

I have two predictions: we will see progress with bispecific siRNAs in the liver and CNS, and the success of siRNA programs in lung.

Myriam Mendila, Chief Development Officer,
CureVac

I think that in the near future we will see a breakthrough in cancer vaccines as well as in prophylactic vaccines targeting so far untargetable pathogens (e.g., bacterial/fungal pathogens) with high unmet need. Given the efforts and progress in delivery of RNA based therapeutics, I also expect rapid progress in organ-targeted delivery of RNA therapies which will open new frontiers for medical applications of RNA technologies in other therapeutic areas such as, for example, autoimmune diseases or other diseases requiring more local reach of RNA therapeutics (ophtha/mucosa etc.) .

David Salzman, Chief Executive Officer,
Gatehouse Bio

Over the next five years, I believe the nucleic acid field will continue to be one of the fastest growing areas in healthcare and that growth will accelerate across multiple sectors including:

- AI-powered target discovery and drug design;
- advancements in conjugates and lipid nanoparticles for tissue and cell-specific oligonucleotide delivery; and
- improvements in oligonucleotide manufacturing that improve yield and lower racemic mixes.

John Counsell, Associate Professor,
University College London

I predict we'll see genAI incorporation into DNA and mRNA coding designs. Improved *de novo* DNA synthesis capabilities will emerge, accelerating access to materials for R&D. More approvals of nucleic acid therapeutics will clear the regulatory pathway for future products. Improved nonviral DNA delivery systems will emerge, addressing a challenging unmet technological need.

Yupeng Chen, Associate Professor at the University of Connecticut and Co-Founder of Eascra Biotech

I expect significant advancements in mRNA and gene editing therapies, along with a surge in new delivery technologies designed to target hard-to-reach tissues.

Veikko Linko, Associate Professor, University of Tartu, Estonia and Visiting Professor, Aalto University, Finland

Many researchers who have been working with DNA nanostructures in our field are now increasingly focusing on similar fully RNA-based or hybrid RNA/DNA nano-objects. Therefore, I believe there might be also some developments within the following areas:

- more (and more precise) CRISPR/Cas -based genome editing using DNA/RNA nanostructures;
- new mRNA delivery vehicles/systems;
- DNA/RNA nanostructure-based cancer immunotherapies/vaccine development; and
- tackling antimicrobial resistance (AMR) using nucleic acids.