Converging on the future of bio–nano science

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Abstract

The field of bio–nano science is at a crossroads. Tremendous advances have been made in the last decade, including the development of many new types of nanoparticles and nanomaterials,1–4 in parallel with a substantial increase in our understanding of bio–nano interactions.5–8 Despite this, there is a growing frustration in the field that “research as usual” is not enough; that our current approach is neither the best way for facilitating impactful and robust exploratory research, nor for accelerating translational work towards real-world applications, such as improved patient outcomes in diseases ranging from cancer and diabetes to HIV.9,10

To address these issues, we identify several key topics that have emerged as part of research “convergence”.9 Examples include areas such as (i) the advantages of cumulative research; (ii) the necessity of aligning projects with research priorities; (iii) the value of transparent science; (iv) the opportunities presented by “dark data”; and (v) the importance of establishing bio-nano standards.9,11 Pursuing and adopting these areas require adjustments in how we think about science and how we conduct research, but we believe they are central for accelerating scientific discovery and translational research at the intersection of chemistry, materials science, engineering, and biomedicine; to help shape the future of bio–nano science.

References

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