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**Precision engineering & data analytics propel global biopharma revolution: Gaurav Kaushik**

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Precision engineering and data analytics have revolutionized the global biopharma industry by unlocking the potential of large-scale data to drive innovation, improve patient outcomes, and optimize business processes. As data analytics continues to advance, its impact on the biopharmaceutical field is likely to expand even further, fostering a more personalized, efficient, and effective approach to healthcare, said Gaurav Kaushik, managing director & CEO, Meteoric Biopharmaceuticals.

The global biopharma sector stands on the cusp of a momentous revolution fuelled by the convergence of emerging technologies and the expanding significance of data analytics. As the boundaries of innovation continue to be pushed, this dynamic combination is reshaping the future of biopharma worldwide, catalysing breakthroughs in research, development, and patient care, he added

Some significant areas where we see transformational change occurring that will reshape the way the industry functions include enzymes where precision engineering has improved bioprocessing. Enzymes play a vital role in bioprocessing, optimizing the production of therapeutic proteins, enzymes, and other biologics. With emerging technologies and data analytics, researchers can tailor enzyme characteristics, improve stability, and enhance catalytic efficiency, leading to more efficient and cost-effective bioproduction processes. For instance, advanced modelling techniques enable the identification of optimal enzyme candidates for specific manufacturing challenges, reducing time-to-market and enhancing overall productivity, stated the chief of Meteoric Biopharmaceuticals, an Ahmedabad based company manufacturing and marketing enzymes and, finished formulations.

The application of emerging technologies and data analytics in pre and probiotics is transforming the landscape of personalized therapeutics and gut health. Data analytics analyses complex microbial datasets and patient profiles. Researchers can identify specific strains and formulations that have the potential to modulate the gut microbiome, resulting in personalized interventions for various health conditions. This approach enables tailored treatments and targeted interventions that improve patient outcomes, enhance overall well-being, and reduce healthcare costs, said Kaushik.

Emerging technologies and data analytics are driving advancements in the development and manufacturing of biosimilars. AI and ML algorithms enable researchers to analyse complex molecular structures, predict manufacturing challenges, and optimize processes to ensure high-quality and cost-effective production of biosimilar products. Data analytics also plays a crucial role in comparative studies, ensuring the similarity and safety of biosimilars to their reference products. These advancements expedite biosimilar development, increase accessibility to affordable therapies, and support the sustainability of healthcare systems worldwide.

In an increasingly regulated biopharma landscape, emerging technologies and data analytics are invaluable for managing regulatory compliance. Organizations can streamline data collection, analysis, and reporting by integrating digital systems and advanced analytics, ensuring compliance with stringent regulatory requirements. This enables efficient tracking and traceability of critical data, expedites regulatory submissions, and enhances overall compliance across the biopharma value chain. For instance, blockchain technology enhances data integrity, supply chain traceability, and transparency, facilitating compliance with regulatory standards and building stakeholder trust, he noted.

As emerging technologies and data analytics converge, the global biopharma sector is at the precipice of transformative change. Enzymes, pre and probiotics, biosimilars, and managing regulatory compliance are just a few areas benefiting from these advancements. AI, ML, blockchain, and data analytics are reshaping the foundations of biopharma, enabling precision engineering, personalized therapeutics, accelerated development, and robust compliance. These technological advances and foster a culture of data analytics will be pivotal for biopharma leaders worldwide to spearhead innovation and redefine the frontiers of the global biopharma industry, said Kaushik.



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