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Blockchain technology in clinical trials: Enhancing transparency, security, and efficiency

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Blockchain is a decentralized, distributed ledger technology that records transactions securely and transparently across a network of computers. Instead of being stored in a central database, data is stored in blocks that are linked together in a chain, ensuring immutability and security.

Blockchain is decentralized – no single authority controls the blockchain instead, multiple participants (nodes) maintain the network. It is transparent – data transactions are visible to all participants, enhancing trust. It immutable – once a transaction is recorded, it cannot be altered or deleted. It assures security – data is encrypted using cryptographic algorithms, making it tamper-proof. Blockchains consensus mechanism helps transactions to be verified by network participants using protocols like proof of work (PoW) or proof of stake (PoS).

Blockchain technology has the potential to revolutionize clinical trials by enhancing transparency, security, efficiency, and trust in the process. Blockchain can be utilized in clinical trials for data security and integrity, streamlined data sharing, patient data privacy, Real world evidence integration, patient recruitment and retention, informed consent management, drug supply management, sample collection and distribution, decentralized clinical trials.

Even though blockchain is a great technology its adaptation to clinical trials is challenging. stakeholders should consider challenges like scalability, lack of regulations, need intensive trainings and cost of implementation

Keywords: Blockchain, Clinical trials, decentralization, Security

Biography

Shashidar Reddy Abbidi is a results-driven professional with over 8 years of experience in clinical data management, combining his expertise in healthcare and technology. He holds a Bachelor's in Pharmacy and a Master's in Information Technology, which allows him to approach data integrity and compliance with a unique perspective. Passionate about optimizing data workflows and ensuring adherence to regulatory standards (ICH-GCP, CDISC, FDA/EMA), He leads cross-functional teams to deliver high-quality datasets for clinical trials. He is skilled in clinical data systems like EDC, Medidata Rave, and Veeva, and is dedicated to mentoring future data professionals while exploring AI/ML advancements in clinical research.

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