Blockchain in Pharmacy: Enhancing Security, Transparency, and Efficiency

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Abstract

The pharmaceutical industry faces significant challenges in ensuring drug security, supply chain transparency, and overall efficiency. Counterfeit drugs pose a major threat to patient safety, while fragmented traceability data hinders effective monitoring. Blockchain technology, with its core principles of decentralization, immutability, and transparency, offers a promising solution. Blockchain can enhance drug security by creating a tamper-proof record of a medication's journey from manufacturing to dispensing. Cryptographic techniques secure data, safeguarding against unauthorized access and manipulation. This not only protects sensitive patient information but also safeguards intellectual property. Furthermore, blockchain promotes supply chain transparency by providing a shared ledger accessible to authorized participants. Every step in the drug's lifecycle is documented, enabling real-time tracking and verification of authenticity. This transparency fosters trust among stakeholders and empowers regulatory bodies to enforce compliance more effectively. Blockchain can improve efficiency within the pharmaceutical industry. Streamlined data exchange and automated verification mechanisms can expedite regulatory processes and optimize inventory management. Additionally, smart contracts can automate transactions, reducing administrative burdens and facilitating faster product movement. By analysing the potential of blockchain to address critical challenges in security, transparency, and efficiency, this transformative technology can reshape the future of pharmaceuticals.

Keywords

Blockchain in Pharmacy, Drug Security, Supply Chain Transparency, Pharmaceutical Efficiency, Counterfeit Drugs, Traceability, Decentralization Cryptographic Techniques