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Ethical Considerations of CRISPR Gene Editing

BLUF

Encryption of DNA and being able to integrate a malevolent code within DNA format raises multiple ethical questions concerning privacy, security and application of genetic data. While this technology is capable of generating a breakthrough in medical science, the loopholes created through such advancements need to be addressed with caution.

Privacy Risks of Digital DNA

Privacy is probably the most significant ethical issue here. DNA holds the most personal data regarding a person's identity and background, too, which may reveal the health issues he or she might face in their life. DNA also shares a huge amount of information concerning a person's identity, his or her family, possible diseases as well as genetic disorders. Stealing a password or a credit card is not the same as hacking someone's DNA, because one cannot just change his or her DNA. If somebody hacks the database where DNA information is stored and obtained from testing companies, he or she might leak it online or use it against the person. As a result, DNA testing companies must provide enough protection especially for data, which include DNA information.

Security Risks in Biotechnology

Lastly, another concern is the security of computer systems performing the analysis of DNA samples. Scientists demonstrated that it is plausible to conceal a malicious computer code within the DNA strand. Once the final analysis of the DNA has been conducted through a computer in a laboratory, there is a potential risk of executing the computer code and taking over control of the

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machine. This shows that with the intersection of biology and computers, biology-related technologies will present new cybersecurity implications.

Ethical Use of Genetic Data

There are concerns about the use of organizational DNA now that it is in a digital format. Some companies collect DNA for genealogy or genetic health reports however, that information could be passed along to research facilities or organizations as well. The majority of individuals may not be aware of how their DNA-related information is used and stored. This situation leads to questions regarding ethical issues like informed consent, ownership, and transparency.

Conclusion

The use of DNA technology can lead to significant medical discoveries however, its rampant use can raise ethical implications concerning privacy and security. As the DNA constitutes a unique record of the individual, demanding organizations to implement ethical regulations to strengthen cybersecurity around its use. As this technology advances, the versatility it provides must be balanced with privacy commitments.