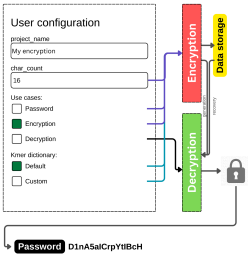
Jan 14, 2026

DNAcrypt-AI protocol for generating and encrypting a secret key



DOI
https://dx.doi.org/10.17504/protocols.io.14egn12k6v5d/v1

Marvin De los Santos[1], Chikie Lynn[1]

[1]ChordexBio

Marvin De los Santos
ChordexBio

DOI: https://dx.doi.org/10.17504/protocols.io.14egn12k6v5d/v1

Protocol Citation: Marvin De los Santos, Chikie Lynn 2026. DNAcrypt-AI protocol for generating and encrypting a secret key. **protocols.io** https://dx.doi.org/10.17504/protocols.io.14egn12k6v5d/v1

Protocol status: Working
We use this protocol and it's working

Created: January 10, 2026

Last Modified: January 14, 2026

Protocol Integer ID: 238375

Keywords: DNAcrypt-AI, FAS2rDNA, Covary, ChordexBio, DNA-based cryptography, human genome, k-mer encoding, sequence-based encryption, secret key generation, DNA sequence hashing, programmable biology, bioinformatics security, synthetic DNA computing, sequence reconstruction, machine learning–assisted encryption, cloud-based computational workflow, Jupyter Notebook, Google Colab, secret key dnacrypt, throughput dna sequence reconstitution pipeline, dnacrypt, using dnacrypt, digital credentials as genome coordinate, readable genome metadata representation, dna, genome vocabulary, encryption data, genome coordinate, sequence intelligence model, secret key, length secret key, decryption, plaintext key, based alphanumeric encoding, inspired cryptographic framework, alphanumeric encoding, cryptographic framework, expected secret key, password recovery, fas2rdna, pipeline, ai protocol, alphanumeric character, sequence, password, digital credential

Disclaimer

Abstract

DNAcrypt-AI is a human genome-inspired cryptographic framework that leverages k-mer-based alphanumeric encoding, genome vocabulary, sequence reconstruction, and sequence-informed machine learning to generate and encrypt digital credentials as genome coordinates. This protocol describes the procedure for generating a fixed-length secret key (16 characters) and encrypting it using DNAcrypt-AI. Unlike passwords that may comprise alphanumeric characters and symbols, secret keys are devoid of symbols. The pipeline is implemented on Google Colab and integrates a high-throughput DNA sequence reconstitution pipeline (FAS2rDNA) with a sequence intelligence model (Covary) to randomly generate a plaintext key into an encrypted, non-human-readable genome metadata representation. The protocol generated the expected secret key of 16 characters long and provided an encryption data that can be used for decryption and password recovery.

Before start

For this protocol, a 16-character secret key will be generated using the Jupyter notebook of DNAcrypt-AI that is hosted on Google Colab. DNAcrypt-AI is dependent on a high-throughput DNA sequence reconstitution pipeline (**FAS2rDNA**) and sequence-informed machine learning model (**Covary**).

Protocol procedure

1 Launch DNAcrypt-AI from **https://dnacryptai.chordexbio.com/**

1.1 Alternatively, you can run DNAcrypt-AI using the recommended methods described in https://github.com/mahvin92/DNAcrypt-AI.

2 Create a configuration by modifying the user interface, as shown in Figure 1 below.

Figure 1. The interface of user configuration on DNAcrypt-AI, where users can specify the behavior of the cipher.

2.1 Type the number *16* in the *char_count* text box.

Note that users can generate secret keys with length from 6 to 90 characters.

2.2 Select the *Encryption* checkbox, ensuring to uncheck the other options under the *Use cases* section.

3 Run DNAcrypt-AI by initiating a runtime, ensuring a GPU (T4 as default) support, if available. Note that DNAcrypt-AI will still work in a non-GPU hosted runtime.

```
Initiate a runtime:


Click 'Runtime' -> Select 'Run all'
```

4 Wait for DNAcrypt-AI to finish running. The status and any error will be displayed below the code cell.

5 Allow the browser to download the *DNAcrypt_metadata.json* file. This is your encrypted data and is recommended to be renamed.

5.1 Note that if no download is produced, you can fetch the file from the */content/* directory through the File browser.

6 Save and store your encryption, digitally or physically by printing a copy.

Note that the encryption data is light and about 200kb in size only. When storing the data as a physical copy, ensure to print legibly to allow encoding to a digital copy later on for recovery.

Application note

7 This protocol is designed for generating secure, non-human-readable secret keys encoded as human genome coordinates. It is suitable for cryptographic demonstrations, secure credential generation, and experimental DNA-based security research.