IEEE
International Conference
on
PKI and Its Applications
(PKIA-2017)
November 14-15, 2017

Hotel Chancery Pavilion, Bangalore

DNA Cryptography: Contributions to Information Security, Bio-PKI, Applications and Challenges

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DNA :The Molecule of Life

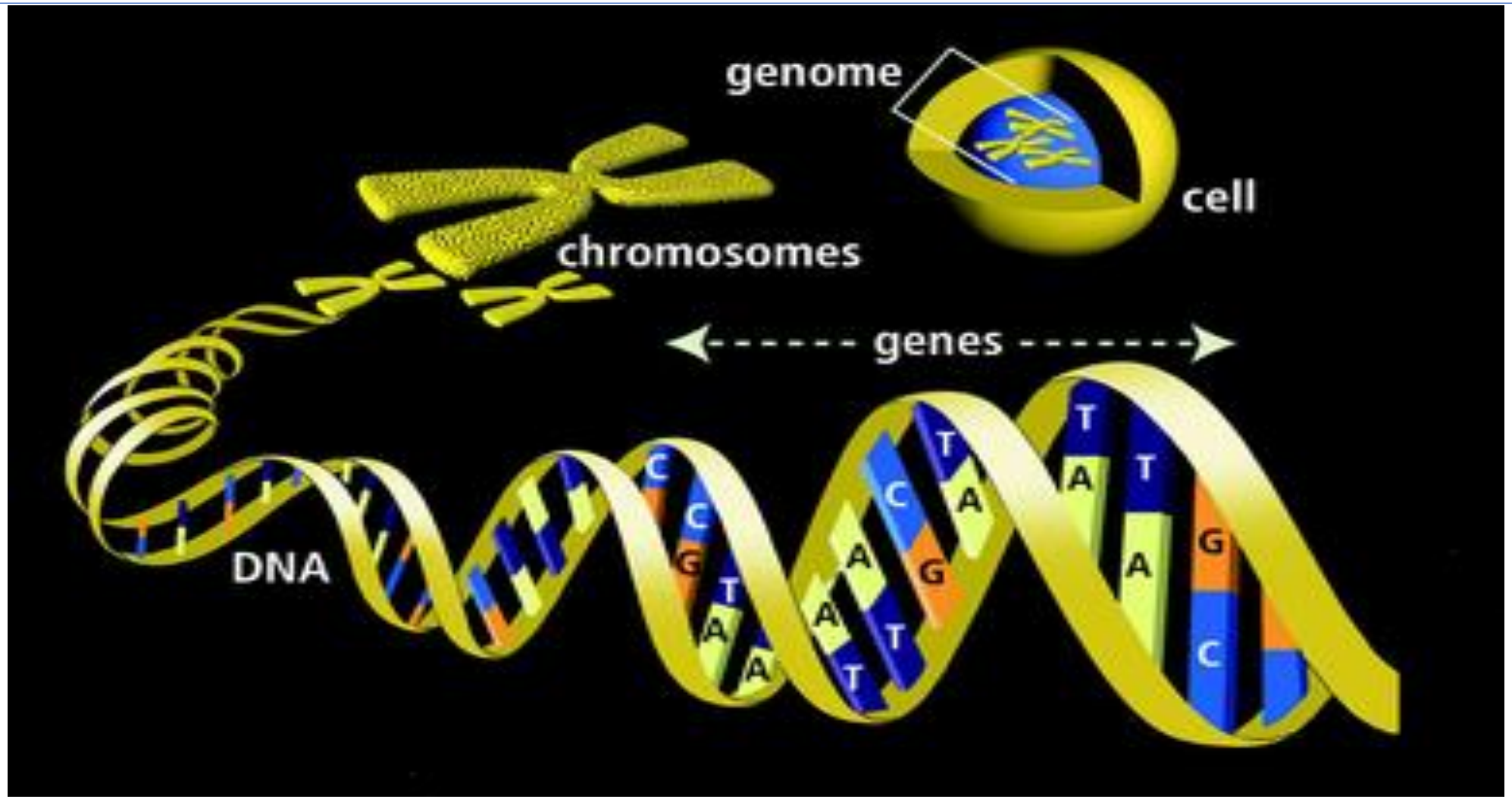

Fig.1: Helical structure of DNA [1]

DNA COMPUTING

- Adleman's experiment[2]
- DNA Steganography[3]
- Human Genome Project[4][5]

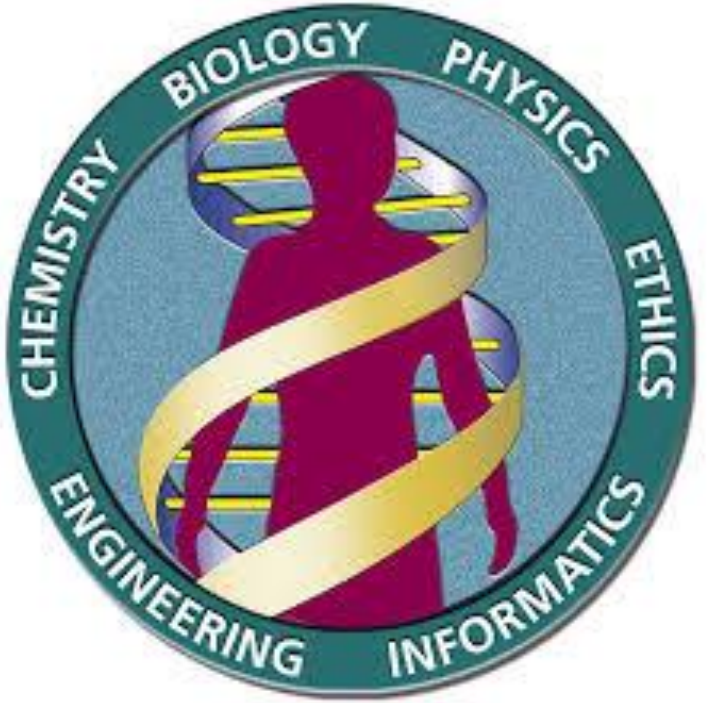

Fig.2: The Human Genome project [4]

- Numerical Representation of DNA Sequences[6]

DNA CRYPTOGRAPHY

- Symmetric DNA Cryptography
- Asymmetric DNA Cryptography
- Pseudo DNA Cryptography
- DNA Steganography

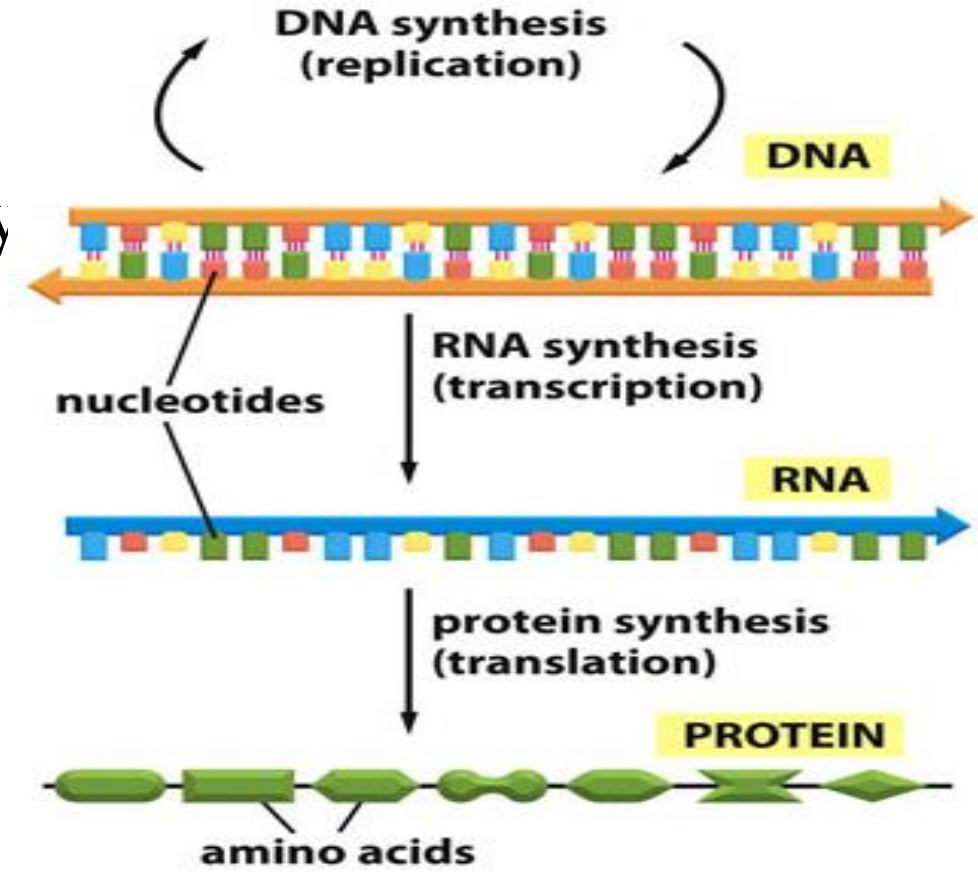

Fig.3: The Central Dogma of Molecular Biology [7]

DNA based Authentication –Research Work

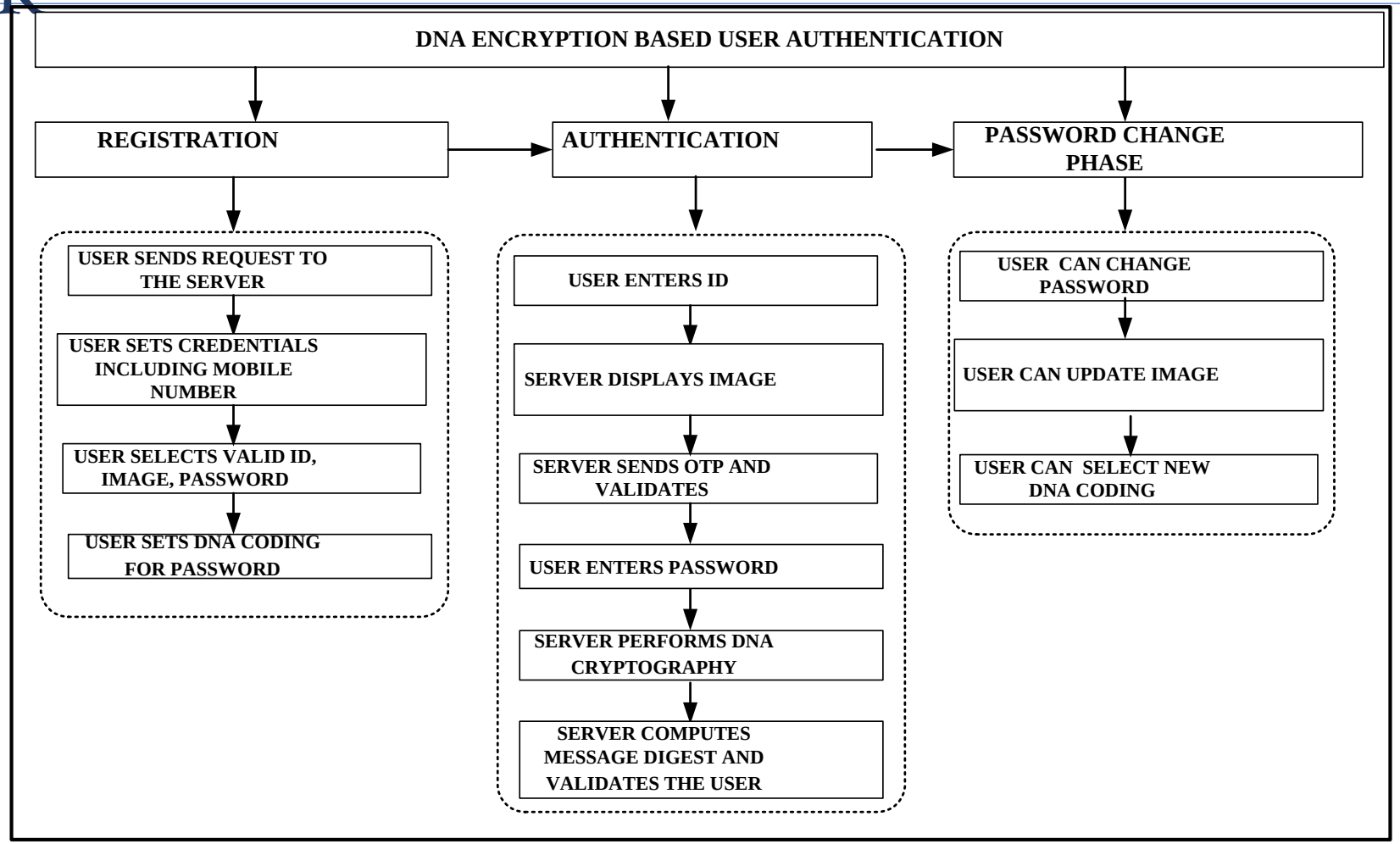

Fig.4:Process flow of DNA based Authentication [8]

DNA Biometrics and BIO – PKI

Fig.5 :DNA for Biometrics [9]

- NIST focuses on DNA typing methods for Biometric Purposes[9].
- To decrease the time required to perform a DNA test.

Applications and Challenges

- Healthcare.
- Anti – Counterfeiting based on DNA.
- Information Security
- Positive Identification
- Wet lab
- Time
- Ethical

References

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8. Mohammed Misbahuddin, and Sreeja C.S. A Secure Image-Based Authentication Scheme Employing DNA Crypto and Steganography. Proceedings of the Third International Symposium on Women in Computing and Informatics, held during August 10-13, 2015, India (DOI: http://dx.doi.org/10.1145/2791405.2791503)

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9. DNA Biometrics https://www.nist.gov/programs-projects/dna- biometrics.

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Acknowledgement

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