METHOD TO REPORT AND DEMONSTRATE THE TRANSACTIVATION OF CYCLIC AMP- INDUCED GENE EXPRESSION

IITM Technology Available for Licensing

Problem Statement

- Existing methods for measuring intracellular cAMP, such as radioimmunoassays and enzyme immunoassays, are costly and require the destruction of large amounts of cells.
- Commercially available CRE reporter systems for cAMP are indirect and prone to activation by other signaling pathways, complicating accurate measurement and interpretation.
- There is a need for **a direct method to report and demonstrate the transactivation of cAMP-induced gene expression in mammalian cells,** which has led to the development of a synthetic biology-based reporter system.

Intellectual Property

- IITM IDF Ref. **1555**
- **IN 362101 - Patent Granted**

Technology Category/ Market

Category - Synthetic Biology
Applications - Pharmaceutical, Cancer Research,
Industry - Biotechnology and Pharmaceutical

Market - Global gene expression market is on a robust growth trajectory, with the market value expected to surge from US$14.5 billion in 2022 to an estimated US$20.8 billion by 2030, with a steady CAGR of 5.3%.

TRL (Technology Readiness Level)

TRL - 3, Proof of concept stage.

Research Lab

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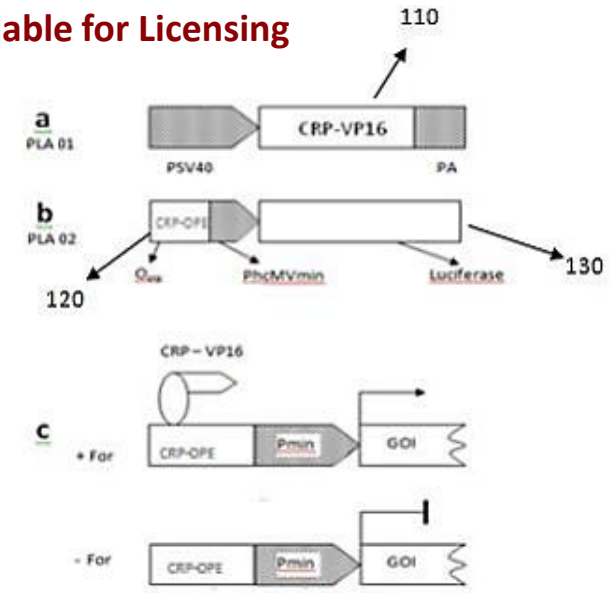

FIG.1. illustrates a method of construction of a CRP based transgene expression system.

Technology

1

- **Development of a direct method for reporting cAMP levels in mammalian cells using a synthetic construct combining the bacterial transcription regulator CRP with the transactivating factor VP16 from Herpes simplex virus.**

2

- **The synthetic construct, CRP-VP16, binds to CRP operator sequences in the presence of cAMP, enabling concentration-dependent reporting of cAMP levels and transactivation of cAMP-induced gene expression in mammalian cell lines, independent of PKA and CREB signaling pathways.**

3

- **This novel approach facilitates the assessment of hormone function, regulatory protein activity, and drug effects by measuring intracellular cAMP levels, offering potential applications in studying aberrant cAMP signaling in cancer cell lines with mutations affecting PKA and CREB.**

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Key Features / Value Proposition

1. Direct and Accurate Measurement:
Revolutionizes cAMP assessment in mammalian cells with precise, direct reporting, avoiding costly and destructive traditional methods.

2. Independent Transactivation:
Enables cAMP transactivation via synthetic CRP-VP16 construct, bypassing PKA/CREB signaling pathways for robust functionality.

3. Versatile Compatibility:
Compatible with various mammalian cell lines, including cancer cells with aberrant cAMP signaling, ensuring broad applicability.

4. Synthetic Biology Innovation:
Integrates bacterial transcriptional regulator CRP with mammalian cells, leveraging synthetic biology for advanced cellular functionality.

5. Simplified Workflow:
Streamlines experimental process by delivering construct via vectors, facilitating entry into cells for efficient implementation.

6. Comprehensive Applications:
Provides insights into hormone function, regulatory protein activity, and drug effects, expanding molecular pharmacological studies in GPCR research.

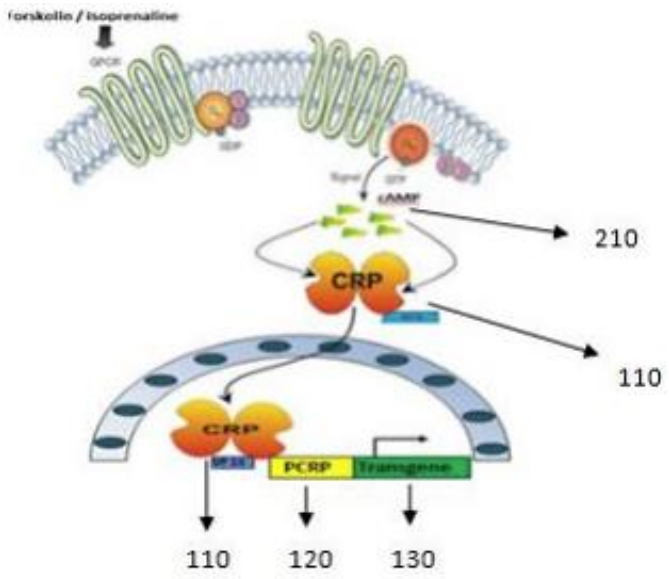

FIG.2. illustrates a graphical representation of the functionality of the synthetic cAMP signalling in mammalian cells.

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