

## **Light mediated activation of cAMP pathway in bPAC**

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Cyclic adenosine 3'5 monophosphate (cAMP) is a molecular second messenger involved in coordinating the cardiac cell response to its environment. Chronic cAMP elevation results in cardiac hypertrophy, which can lead to heart failure. In this study we will investigate the ability of optogenetically controlled cAMP generation to induce hypertrophy in cardiac cells.

Optogenetic photoactivatable adenylyl cyclase from *beggiatoa* (bPAC) has been identified as a useful tool to induce and investigate cAMP with high spatial and temporal control upon exposure to light. This study utilizes photoactivatable bPAC cells to induce the physiological outcomes of cAMP elevation, detected by the presence of the peptides ANP and BNP produced during cardiac hypertrophy. This study provides a framework for the use of optogenetic probes in controlling physiological response.