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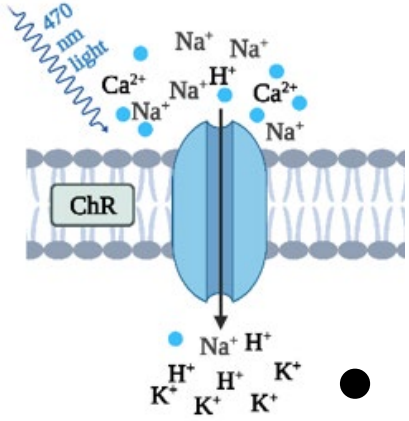
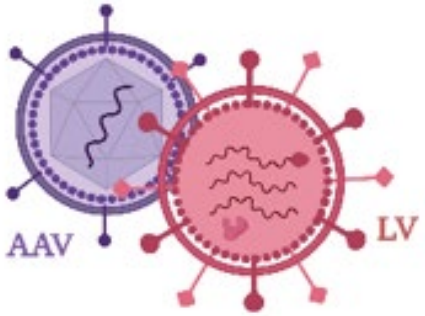
Optogenetics in oral and craniofacial research

Key words: Lasers; Cell differentiation; Bacterial virulence; Nervous system; Neurophysiology; Behavioral science

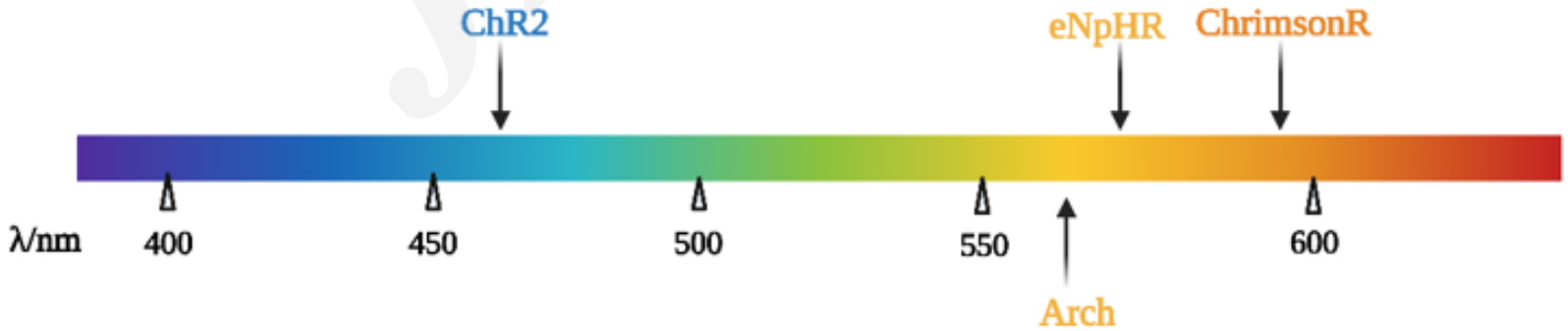
Research summary

This review briefly summarizes a variety of optogenetic studies in the oral and craniofacial fields, describes their research and characteristics, focuses on their application and research achievements:



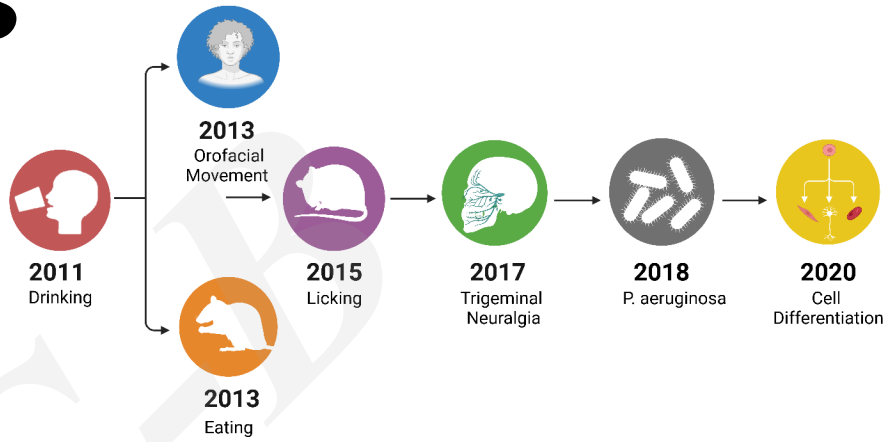


- **Optogenetics and basic science**
- **Optogenetics and preclinical studies**
- **Perspectives and limitations**



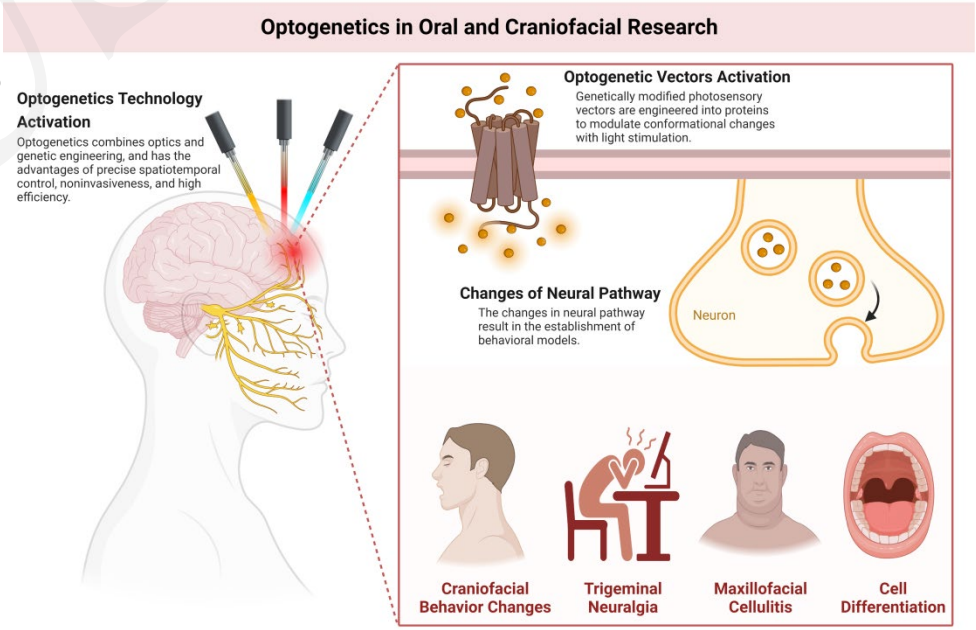
Innovation points

- **Introduction** of various optogenetic studies and applications in the oral and craniofacial fields.



- **Summary** of the optogenetic research protocols and characteristics, and the advantages of bacterial and neuronal regulation in the field of optogenetics.

- **Emphasis** of the limitations and future directions of optogenetics in the oral and craniofacial fields



Innovation points

A series of comprehensive figures were generated to summarize the latest knowledge about optogenetics in oral and craniofacial research.

Figure 1 | Optogenetic applications in oral and craniofacial research.

Figure 2 | Classification of optogenetic sensors and excitation wavelengths.

Figure 3 | Timeline of the first optogenetic applications in oral and craniofacial fields.

Figure 4 | Diverse mechanisms of optogenetic effects.

Figure 5 | Possible future research directions in optogenetics.

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