

A Historical Analysis of the Searchable NeuroNex Database of Bioluminescent Molecules

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Objective

To gain insight into the chronological development of bioluminescence research to identify potential barriers and advancements in the scientific field

Methodology

- 1 Analysis**
of the properties of the bioluminescent molecules in the NeuroNex Database in chronological order
- 2 Comparison**
to the exponential growth of science since the 1900s

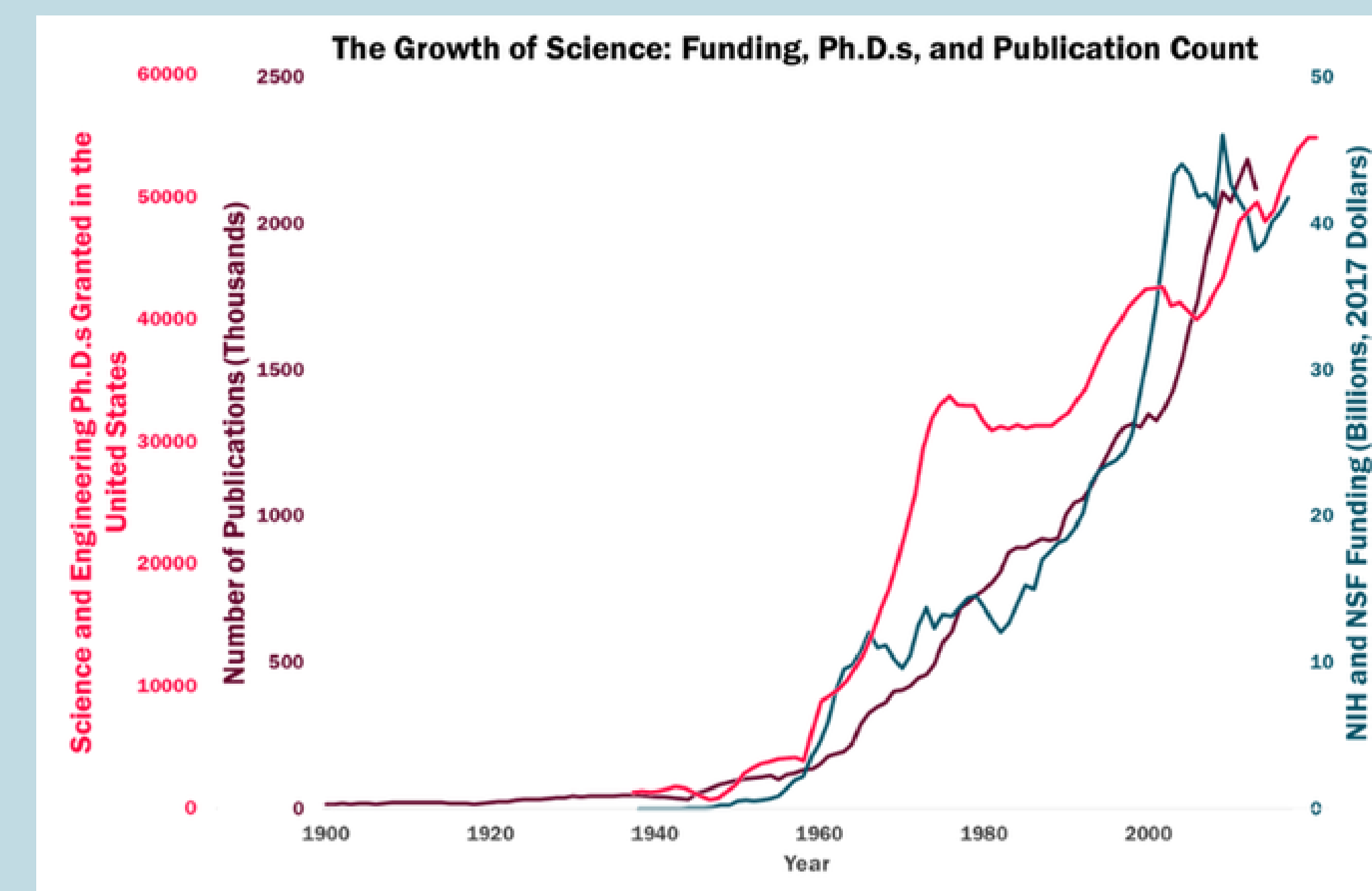


Figure 2: The growth of scientific funding, publications, and PhDs over time is nearly exponential over time

Conclusion

Review
The NeuroNex Database may provide effectiveness, understanding, and further elaboration of bioluminescence. Learning more about bioluminescence can advance the technology that we use today, like optogenetics, and it may lead to the development of more efficient technologies.

Conclusion
By analyzing the data from the database, it may be concluded that early works took an explanatory approach to research while newer works focused on mechanism.

Broader Impact
(1) The database and its analysis allows for comparison for better understanding, (2) discovery of optimal molecules efficiently, and (3) expansion of prior works.

Future Works
To continue to develop the database toward public collaboration

Results

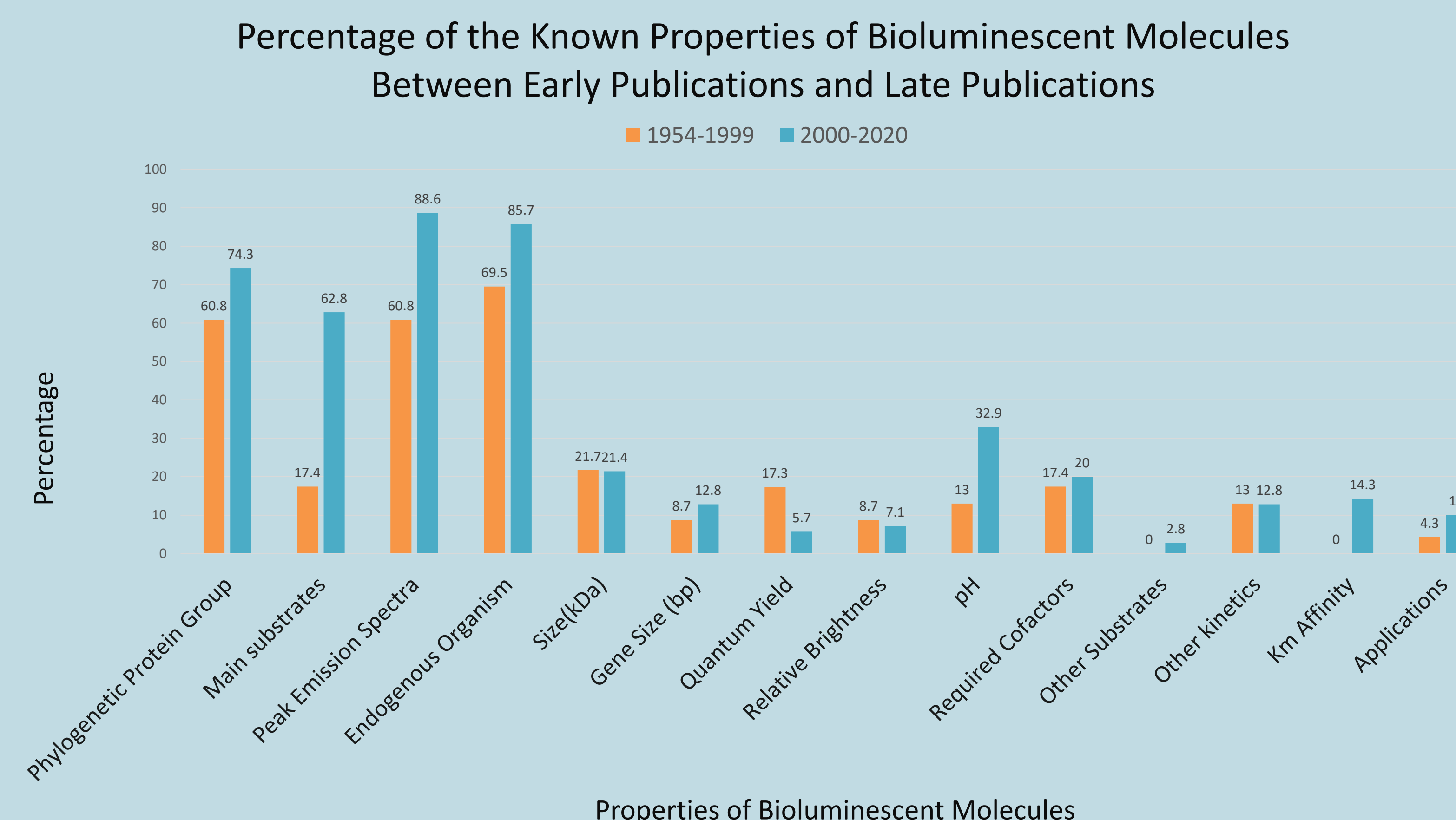


Figure 3: There are more known properties in newer works (2000-2020) than there are in earlier work (1954-1999).

Acknowledgements

We would like to acknowledge the Leadership Alliance at Brown University for supporting this project. We would also like to thank NeuroNex (1707352) and the National Institute of Health (5R25HL088992-14) for funding this project.

References

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What is Bioluminescence?

At minimum, bioluminescence is the emission of light by living organisms. A specific application of bioluminescence in neuroscience is optogenetics, which refers to the manipulation of light-sensitive neurons using light.

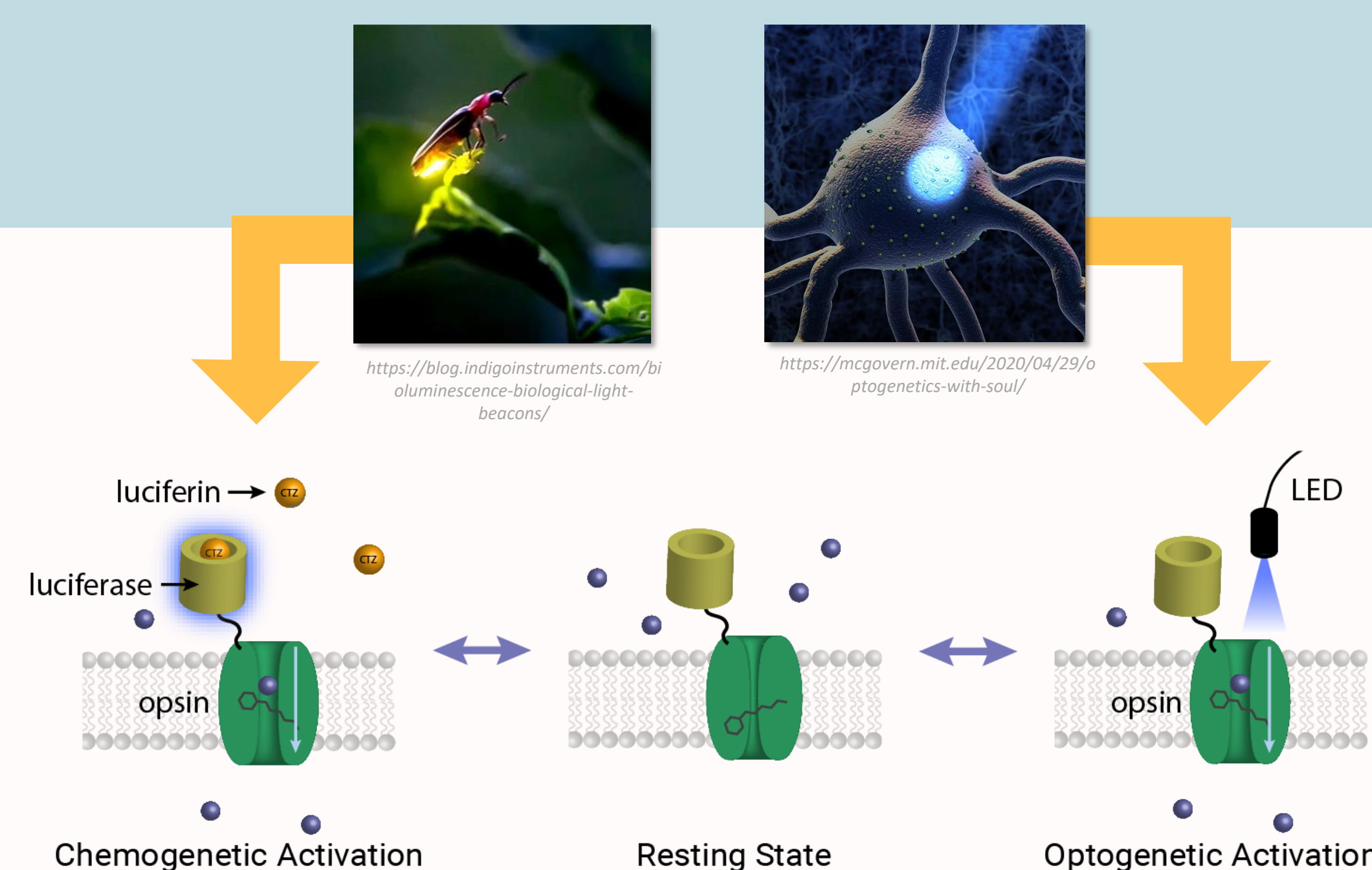


Figure 1: Bioluminescence occurs when specific enzymes, like luciferase, bind to luciferin and activates the cell and produces light. Optogenetics is when light activates the cell (and opens the membrane-bound ion channel to opsin). The function of opsin is to absorb visible light.

What is the NeuroNex Bioluminescent Molecules Database?

The NeuroNex Database is a toolbox for researchers that provides (1) a list of bioluminescent molecules, (2) its varying properties and (3) its sources. This toolbox is being developed in a simplified and easy access construct so that researchers may find adequate molecules toward their projects quicker and easier.

What does the information in the NeuroNex Database reveal?

After reaching nearly 100 difference bioluminescent molecules, a historical analysis was conducted. Elaboration on this study is discussed.