Bioluminescent Dinoflagellates

Bioluminescence occurs widely among animals, especially those living in the sea. The most frequently encountered marine bioluminescent organisms may be bioluminescent dinoflagellate algae living on the surface layer of seawater. Over a dozen different genera exhibit bioluminescence. The organisms in Carolina’s cultures are all members of the genus *Pyrocystis*, found in warm temperate and tropical waters.

**Immediate care and handling**

As soon as your culture arrives, open the shipping container, remove the jar, and inspect the culture for damage that may have occurred during the shipping process. Maintain at normal room temperature (65 to 75° F, 18 to 24° C). Avoid rapid temperature fluctuations. Be aware that your culture may need a week or more to recover bioluminescent ability after it has been shipped. Simply moving the culture from light to dark is not sufficient for it to recover bioluminescence, as the chemical reaction is related to the organisms’ circadian rhythm. You will need to reestablish a circadian rhythm to recover bioluminescence before manipulating or diluting your culture. This process can take a week or more to complete, depending on the conditions your culture experienced during shipping.

**Recovering bioluminescence**

To induce and observe bioluminescence, you will need a space devoid of ambient light and equipped with either a cool white fluorescent or white LED lamp and a lamp timer. Suspend the lamp approximately 14” from the culture. Do not use an incandescent bulb, as this can generate excess heat that damages the culture.

Our culture has been maintained using 12-hour cycles of light and dark. The light cycle has been 8 PM until 8 AM (EST); dark has been 8 AM until 8 PM (EST). This allows for convenient study of the bioluminescent trait within a traditional classroom schedule. If you want to alter this schedule, it may take several weeks for the organisms to adjust and begin to show bioluminescence again. **Note:** Bioluminescence can only be observed during the dark portion of the cycle and is most evident 1 to 2 hours after the dark portion of the cycle begins. It is best to observe bioluminescence in a completely darkened room.

To induce bioluminescence, gently shake the culture jar to agitate its contents. When agitated by shaking, individual dinoflagellates give off brief flashes of bright blue-green light. The dinoflagellates will not exhibit a constant glow, and the glow will fade as the culture is agitated multiple times within the same dark cycle. Allow the culture to recharge with a light cycle before attempting to observe bioluminescence again. If you have been unable to observe bioluminescence after 10 days of light cycles, please contact Carolina’s technical support department for assistance.

Once you verify the culture has recovered bioluminescence, we recommend that you transfer the culture to a 250-mL Ehrlenmeyer flask containing a fresh preparation of medium. To prepare the culture flask, add 150 mL of *Bioluminescent Dinoflagellate Medium (item #153757)* to the flask. Then add the dinoflagellate culture to the flask, and cap or cover it using a foam plug or Parafilm®.

**Dividing cultures**

As the dinoflagellates reproduce, the bioluminescent glow will increase in intensity. A healthy dinoflagellate culture should be divided. Cultures can be divided every 3 to 4 weeks. To divide a culture, pour 150 mL of fresh *Bioluminescent Dinoflagellate Medium* into a clean Ehrlenmeyer flask. Then pour approximately half of the culture needing division into the fresh medium preparation and cover the mouth of the flask. Replace the volume poured from the parent flask with fresh *Bioluminescent Dinoflagellate Medium*.

(continued)
FAQs

My dinoflagellate culture is not glowing. What can I do?
This is not abnormal. The shipping process and any adjustments to the light/dark cycle may interfere with the dinoflagellate’s ability to express the bioluminescent trait. If your culture has not shown bioluminescence after cycling for 10 days, contact Carolina’s technical support department.

When is the best time to observe bioluminescence in the culture?
At least 30 minutes after the culture’s dark cycle begins.

I need more medium. What can I use?
You can use either our Bioluminescent Dinoflagellate Medium (item #153757) or Alga-Gro® Seawater (item #153754).

Can I alter the light/dark cycle of my culture?
Yes, the cycle can be altered, but be advised that it can take several weeks for the culture to begin to glow again once the established cycle has been changed.

Problems?
We hope not, but if so, contact us. We want you to have a good experience.
- Orders and replacements: 800.334.5551, then select Customer Service
- Technical support and questions: caresheets@carolina.com