

Bioluminescence

Microcosm describes a miniature representation of a living or non-living thing. For example, there are miniature buildings, cars, furniture, dolls, mushrooms, flowers and plants. Microcosm bioluminescent mushrooms are miniatures of real mushrooms that produce light which is visible in the dark as a result of a biochemical reaction. The substance responsible for the emission of light is called luciferin. Studies have found that there is a link between metabolic activity and fungal bioluminescence production. The ecological function of bioluminescence provides the advantage of attracting insects that can help disperse the fungal spores to colonise a new habitat.

Besides fungi, another example of a microcosm bioluminescent is the bioluminescent zebrafish, which was created to assist in drug discovery, chemical safety, and eco-toxicity. It is a miniature of the transgenic zebrafish that produces light by expressing the bacteria luciferase gene. The embryo of a zebrafish is small, transparent, and has almost 80 percent similar genetic sequences with human. Bioluminescence imaging is used to detect affected organs of the zebrafish upon exposure to toxicants. Zebrafish embryo toxicity test using BLI has been proposed as an alternative for acute fish toxicity test due to its efficiency in monitoring live imaging cardiotoxicity and neurotoxicity of toxicants. In addition, bioluminescent zebrafishes can be employed in a high throughput manner with low cost, making them attractive options for a large number of biomonitoring applications. Thus, bioluminescent zebrafish provides a rapid and reliable toxicity screening method to determine adverse effects of drugs, chemicals, or pollutants in zebrafish embryo development.

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