IF I COULD INVENT SOMETHING NEW…

Imagine a world where the boundaries of innovation are constantly being pushed, where every passing day brings the promise of a discovery that could change the course of history. I could invent something new, it would not just be another object or piece of technology, but something revolutionary—a testament to the power of human creativity.

Over centuries, humans have strived to overcome the struggle of darkness, evolving from using animal fat to chemicals like methane, ethylene, and kerosene, and finally to the more sustainable light bulbs we use today. If I could invent something new, it would be "Natural Lighting," a device that harnesses the power of deep-sea bioluminescent microorganisms.

Bioluminescent organisms produce and radiate light. These organisms contain proteins responsible for the light they emit, created by a chemical reaction. According to the Natural History Museum, for this reaction to occur, a plant or animal must carry a molecule called luciferin and one of two enzymes called luciferase or photoprotein. When luciferin chemically reacts with oxygen, it releases energy in the form of light. Different animals and plants contain various types of luciferin, with green and blue being the most common light produced in the ocean, as these wavelengths travel further through water. Luciferase is an enzyme that causes the oxidation of luciferin, creating a visible glow, while photoproteins enhance the light-producing reaction of luciferins.

Instead of incorporating these proteins into lightbulbs, they could be harnessed and embedded into a thin material that can be rolled or applied onto any surface. After the proteins undergo genetic modification, synthesis, and purification processes, they can be fused into a substrate. A substrate is a substance on which an enzyme acts to produce a chemical reaction. Suitable polymer substrates for this application include silicone rubber, hydrogels, and polyurethanes.

According to Omnexus.com, “silicone rubber is a durable and highly-resistant elastomer (rubber-like material).” Hydrogels consist of an absorbent, solid network of natural or synthetic polymers soaked in water or biological fluids, found in everyday products like baby diapers and contact lenses. They act like sponges that hold water. Polyurethane, according to xometry.com, is a typical thermoset polymer compound characterized by durability, flexibility, toughness, and resistance to abrasion, acids/alkalis, solvents, and weathering. These polymers make it easier to roll or apply the material onto a surface.

The idea of harnessing bioluminescent proteins from deep-sea organisms to create sustainable lighting solutions holds great potential across various fields. By leveraging nature's light-emitting abilities, this device can offer sustainable solutions that address challenges in healthcare, the environment, and beyond. This device not only demonstrates the merging of biology with technology but also exemplifies a shift towards environmentally friendly and energy-efficient solutions.

Looking into the future, the boundaries of what is possible continue to expand. The journey towards realizing this device will inspire discoveries and pave the way for a brighter, more sustainable future, driven by the wonders of bioluminescence.

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