BioCue

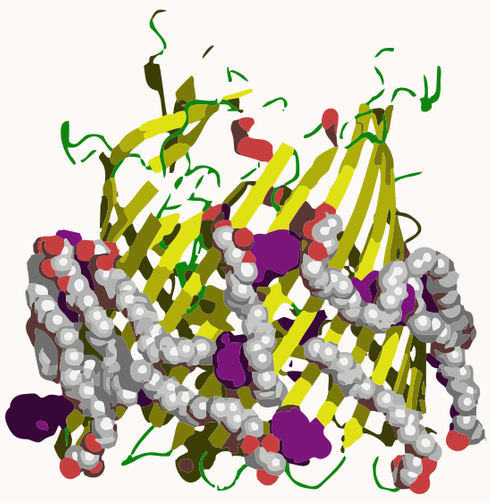
A Living Biophilic Tattoo that Shows You What Your Body Needs

This image is generated by Nano Banana

BioCue is a fictional living tattoo; a hybrid organism that lives gently on human skin and turns invisible body signals into visible glowing patterns. It focuses on human health and body modification, using artful light to show when vitamin and stress levels are out of balance, without any needles, blood tests, or screens.

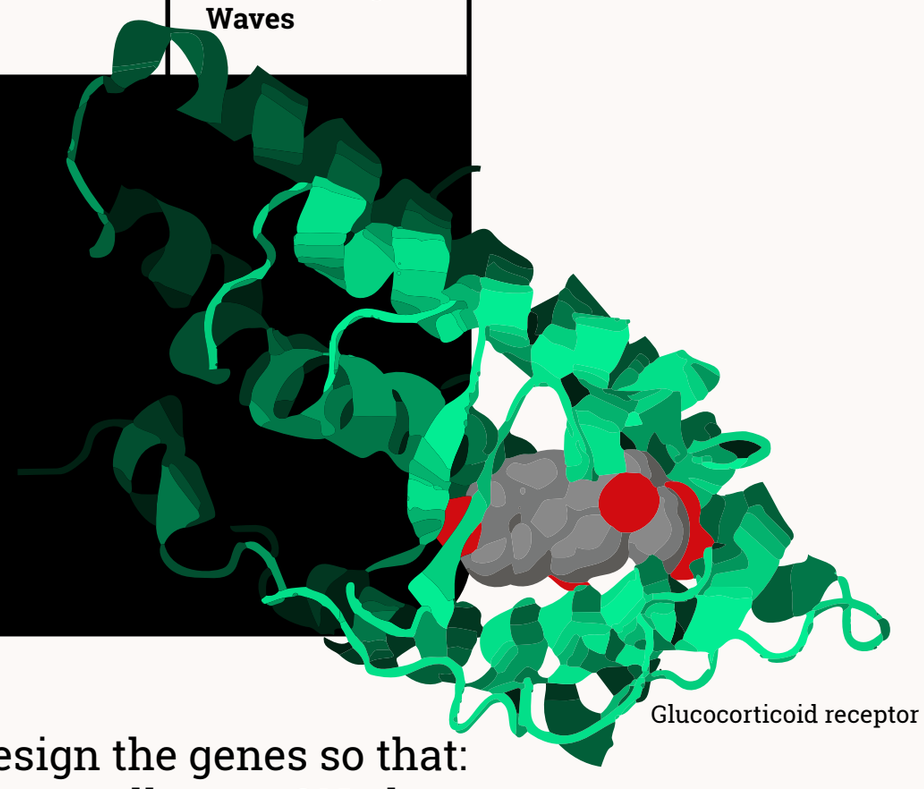
The organism combines skin friendly bacteria and green algae. The bacteria act like workers, sensing changes in sweat and skin fluid, such as drops in vitamins B12 or D and rises in the stress hormone cortisol and triggering specific glow responses. The green algae work like solar-powered cells, capturing light and providing energy and color so the system can stay active on the skin with minimal external input.

On the body, BioCue appears as a thin, glowing tattoo-like film that settles into the skin and grows into soft, organic shapes. Most of the time it looks subtle, but when it senses a deficiency or high stress it turns into clear patterns. Each pattern acts as a visual cue, turning internal health states into easy to read signals.



BtuB receptor

Protein & Function	Role	Condition	Color & Pattern
Stress sensor: Glucocorticoid Receptor	detects cortisol	High Cortisol	Green Glowing Mandala Pattern
B12 sensor: BtuB Receptor	binds B12	Low	Yellow Glowing Spirals
Vitamin D sensor: VDR Receptor	binds Vitamin D	Low	Blue Glowing Waves
Glow: GFP / Luciferase	creates light		
Skin Adhesion: FimH	attaches to skin		
Energy: Rubisco	uses sunlight		
Pattern Control: LuxR / LuxI	Coordinates cells		



Glucocorticoid receptor

Bacteria use a system called quorum sensing - group chat for microbes.

They send and receive chemical messages:
LuxI = makes a signal molecule (message)
LuxR = receives the message (listener)

Design the genes so that:
Some cells turn ON glow
Others turn OFF glow
Some respond faster
Some respond slower
And they are constantly sending LuxI signals to neighbors.

This creates reaction, diffusion systems (the same math that makes zebra stripes and seashell spirals).

Signal spreads outward, cells respond in loops, light appears in organized shapes

This produces natural patterns. So the tattoo is not pre-drawn, it grows its own patterns

https://2014.igem.org/Team:Cambridge-JIC/Project/Overview
https://2023.igem.wiki/bnds-china/description
https://doi.org/10.1016/j.coisb.2021.100378.
(https://www.sciencedirect.com/science/article/pii/S245231002100072X)