

Experiment 12: Bacterial bioluminescence of *Vibrio harveyi*

Mittwoch, Gruppe D

Author: Sereina Stauffer

Members: Jelena Büttler, Francesca Di Giallonardo, Julie Zähringer

Advisor: Munti Yuhana

Introduction

Luminescent bacteria are common in the marine environment. They exist as planktonic forms or/and in symbioses associated with fish, shrimps or other organisms. The host organism can use the bioluminescence as attraction for prey, to escape from predators or for intraspecies communication. *Vibrio harveyi* has been isolated from brackish water shrimps.

Light production is catalyzed by the enzyme **luciferase**. Luciferase is a heterodimer consisting of an alpha and a beta subunit. It catalyzes the oxidation of a reduced flavin and a long-chain aldehyde. So the **light emitting reaction is coupled to aerobic oxidations**.

The expression of the genes for luciferase is induced by a diffusible, small sensory molecule, called **autoinducer**. It can accumulate in the environment during growth and allows bacteria to monitor their population density.

Demonstration

We filled a long glass tube with a well grown liquid culture of *Vibrio harveyi*. In the dark room we turned the tube upside down to allow the oxygen diffuse into the medium and could observe the luminescence. By shaking the tube the light emission got stronger.

Results

The demonstration showed that the enzyme luciferase is only active if oxygen is present.