

Development of BIWA system based on reporter assays using six kinds of fish steroid receptors

Masafumi Nakamura¹, Hiroshi Handa¹, Manami Otani¹, Nobuaki Shirai², Toshiki Okada²,
Akiko Inoue³, Taizo Tsuda³, Toshitaka Ikeuchi⁴

¹Hiyoshi Corporation, Japan. ²Industrial Research Center of Shiga prefecture, Japan.

³ Lake Biwa Environmental Research Institute, Japan.

⁴Department of Bioscience, Faculty of Bioscience, Nagahama Institute of Bio-Science and Technology, Japan.

In teleost fishes, the sensitivities to endocrine disruptors (EDs) for sex steroid signalings are much different from those in mammalian species, because the former species have extra subtype in each receptor for sex hormone, such as estrogen, androgen and progestin. Because such EDs are mainly concentrated into surface water, teleosts are most endangered.

Therefore, reporter-gene assays for EDs using fish receptor genes were developed and tested for detection and estimation of aquatic pollution. Six kinds of cell lines were obtained about estrogen receptor α and β , androgen receptor and , progestin receptor α and β , respectively. All clones were induced reporter activities with corresponding ligands in a dose dependent manner. These cells displayed enough chemiluminescence by 24 hours incubation. Improvements of a luminometer were achieved sensitivity of the order of 1 nM to corresponding hormones in all assays.

They are a good system for rapid, sensitive and reproducible screening of various endocrine disruptors for each steroid signaling system. We name this system 'Biological inspection for water analysis' (abbreviate to Biwa®).