Detection of Potential Estrogenic Endocrine Disruptor Chemicals Using The LUMI-Cell™ ER Recombinant Bioassay. John D. Gordon, Andrew C. Chu, Charlotte L. Taylor, George C. Clark, Mick D. Chu, Xenobiotic Detection Systems Inc., and Michael S. Denison, Univ. of California, Davis. A class of compounds knows as Endocrine Disruptor Chemicals (EDCs), have been shown to have tremendous adverse effects on human and wild life populations. The association between the exposure, and bioaccumulation in the food chain, of EDCs has raised concern worldwide. Identification of EDCs requires a relevant bioassay, which can both detect these chemicals, and provide a relevant estimate of their endocrine disrupting potency. Xenobiotic Detection System (XDS) Inc. developed the LUMI-CELL™ ER bioassay in order to detect EDCs using a high-throughput bioassay system. To detect EDCs, BG-1 cells were stably transfected with an estrogen-responsive luciferase reporter gene plasmid (pGudLuc7ere). The resulting cell line responds to estrogenic chemicals in a time-, dose dependent- and chemical-specific manner with the induction of luciferase gene expression. XDS's LUMI-CELL™ ER bioassay system has tested over 110 chemicals, 53 of these chemicals were recommended by ICCVAM for validation of ER binding and transcriptional activation. Twenty-Eight of the 53 chemicals recommended by ICCVAM have historical data for a positive response, and all of these 28 compounds demonstrated estrogenic activity using the LUMI-CELL™ ER bioassay. Out of the 110 chemicals tested, 69 demonstrated estrogenic activity, while 41 showed no activity. Of the 57 chemicals tested, which were tested as unknowns, 30 were found to possess' estrogenic activity, while 27 showed no activity. The LUMI-CELL™ ER bioassay has an EC50 detection of $1.48x10^{-11}$ for β-estradiol. This level of detection is far lower than any limit likely to be imposed by any regulatory agency. This data clearly demonstrates that XDS's LUMI-CELL™ ER high-throughput bioassay system is a fast, reliable, and relatively inexpensive method for detection of EDCs, meeting many of the requirements mandated by the EPA and ICCVAMs Tier I (screening) requirements for EDC detection assays. Supported by NIEHS SBIR grant ES10533-03, and Superfund Basic Research Grant ES04699.

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