Improving the assessment of endocrine disrupting chemical (EDC) effects on puberty. Stoker, T.E.

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During puberty, key developmental events occur that are critical for normal adult male and female reproductive maturation. Recent studies raised concern that exposure to environmental chemicals alter the normal progression through puberty and lead to impaired reproductive function in the mature animal. Advances or delays in puberty are dependent on the class of chemicals examined and the developmental timing of exposure. For this reason, the US EPA included male and female pubertal assays in their Tier 1 Endocrine Disruptor Screening Program (EDSP). These assays are reliable for detecting changes in the timing of puberty and provide insight into the mode of action involved. These assays are a critical part of the overall Tier 1 battery providing valuable *in vivo* information for a weight of evidence approach. At the same time, these assays are resource intensive (both in time and animals used) limiting the number of chemicals that can be examined. To better prioritize the chemicals to be examined for potential effects on pubertal development, it is of value to develop a series of molecular and *in vitro* approaches that are predictive of potential adverse effects. Accordingly, our laboratory and others have examined a number of approaches and evaluated endpoints that may have value as predictors of EDC activity. For example, there is a distinct increase in GnRH secretion and pulsatility prior to puberty. This critical process can be examined directly *in vitro* using a neuronal cell line or by *ex vivo* methods. In addition, a number of growth factors are important for the progression of puberty and we are currently developing cell-based assays to screen for the impact of a test chemical on the regulation of this process. In related studies, we are also evaluating the potential permanent effects of pubertal delays in the male rat, as EDC-induced reductions in testosterone during puberty have been reported to alter subsequent adult male sexual behavior. Therefore, a better understanding of the impact of EDCs on molecular targets and the potential permanent outcomes should provide the basis for smarter testing and result in a concomitant reduction in the utilization of resources. *Abstract does not necessarily reflect EPA policy.*