Modulation of the extracellular distribution, cellular uptake, and cellular action of phenolic compounds with thyroid hormone disrupting activity by serum proteins

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To clarify the factors that influence the biological effects of endocrine disrupting chemicals within target cells, we investigated the interaction of [^{125}I]2,4,6-triiodophenol and ioxynil, potent thyroid hormone disrupting chemicals, with serum proteins from rainbow trout (*Onchorhynchus mykiss*), bullfrog (*Rana catesbeiana*), chicken (*Gallus gallus*), pig (*Sus scrofa domesticus*), and rat (*Rattus norvegicus*), using native polyacrylamide gel electrophoresis, gel filtration chromatography, and ligand binding assay. [^{125}I]-chemicals bound weakly to proteins in trout and bullfrog serum, and strongly to proteins in chicken, pig, and rat serum samples. Candidate chemical-binding proteins included lipoproteins in trout, bullfrog, and female chicken serum; albumin in bullfrog, chicken, pig, and rat serum; and transthyretin (TTR) in chicken pig, rat, and mouse serum. A weak interaction of [^{125}I]-chemicals with tadpole serum proteins accelerated [^{125}I]-chemical cellular uptake in vitro. The cellular uptake of [^{125}I]-chemicals suggested the presence of phenol-specific cellular uptake system. The differences in the molecular and binding properties of serum chemical-binding proteins among vertebrates, and a phenol-specific cellular uptake system would affect in part the cellular actions of these chemicals.