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**Title:** Differential effects of cortisol and 11-deoxycorticosterone on ion transport protein mRNA levels in gills of two euryhaline teleosts, Mozambique tilapia (*Oreochromis mossambicus*) and striped bass (*Morone saxatilis*)

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**Abstract:** The role of cortisol as the only corticosteroid in fish osmoregulation has recently been challenged with the discovery of a mineralocorticoid-like hormone, 11-deoxycorticosterone (DOC), and necessitates new studies of the endocrinology of osmoregulation in fish. Using an in vitro gill explant incubation approach, DOC-mediated regulation of selected osmoregulatory target genes in the gill was investigated and compared with that of cortisol in two euryhaline teleosts, Mozambique tilapia (*Oreochromis mossambicus*) and striped bass (*Morone saxatilis*). The effects were tested in gills from both fresh water (FW)- and seawater (SW)-acclimated fish. Both cortisol and DOC caused an up-regulation of the Na<sup>+</sup>,K<sup>+</sup>-ATPase  $\alpha$ 1 subunit in SW-acclimated tilapia but had no effect in FW-acclimated fish. Cortisol conferred an increase in Na<sup>+</sup>,K<sup>+</sup>,2Cl<sup>-</sup> cotransporter (NKCC) isoform 1a transcript levels in FW- and SW-acclimated tilapia, whereas DOC had a stimulatory effect only in SW-acclimated fish. Cortisol had no effect on NKCC isoform 1b mRNA levels at both salinities, while DOC stimulated this isoform in SW-acclimated fish. In striped bass, cortisol conferred an up-regulation of Na<sup>+</sup>,K<sup>+</sup>-ATPase  $\alpha$ 1 and NKCC transcript levels in FW- and SW-acclimated fish, whereas DOC resulted in down-regulation of these transcripts in FW-acclimated fish. It was also found that both corticosteroids may rapidly (30 min) alter the mitogen-activated protein kinase signalling pathway in gill, inducing phosphorylation of extracellular signal-regulated kinase 1 (ERK1) and ERK2 in a salinity-dependent manner. The study shows a disparate organisation of corticosteroid signalling mechanisms involved in ion regulation in the two species and adds new evidence to a role of DOC as a mineralocorticoid hormone in teleosts.

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