



## Glucose concentration influences ACTH-stimulated cortisol release by head kidney of rainbow trout

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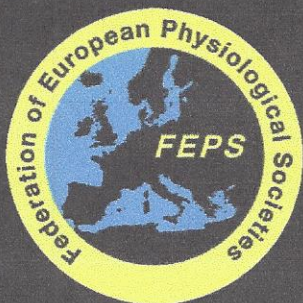
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**GLUCOSE CONCENTRATION INFLUENCES ACTH-STIMULATED CORTISOL  
 RELEASE BY HEAD KIDNEY OF RAINBOW TROUT**  
**Abstract number: P150**

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**Objectives:**

The aim of the present study was to assess if glucose levels could modulate cortisol release by interrenal cells stimulated with ACTH in rainbow trout through a putative glucosensing mechanism

**Materials:**

Head kidneys of rainbow trout were superfused with Hanks medium reflecting hypo-, normo- or hyperglycaemic conditions, in the absence or presence of ACTH to evaluate cortisol release. In a second experiment, static incubations of pools of head kidney tissue were carried out. Cortisol release was assessed in parallel with changes in parameters related to cortisol production and GK-mediated glucosensing mechanism after 10, 30 or 60 min of incubation. Finally, we carried out an immunohistochemical assay using TH and GK antibodies evaluating its colocalization in head kidney of rainbow trout

**Results:**

ACTH-stimulated cortisol release from head kidney of rainbow trout was higher in hyper than in hypoglycaemic conditions in both superfusion and static cultures. Enhanced mRNA abundance of genes related to cortisol synthesis was also noticed in high glucose medium. Parameters related to glucosensing also changed with glucose treatment: glucose levels increase with glycaemia with or without ACTH. Glycogen levels were higher in hyperglycaemic conditions under ACTH stimulation. GSase activity decreased with the increase of glucose in the medium at both conditions whereas in PK activity this occurred only under ACTH stimulation. GK mRNA abundance increased with the increase in glucose concentration in the medium in the presence of ACTH. Specific GK-immunoreactivity in interrenal cells (not in chromaffin cells) further substantiates GK-mediated glucosensing in cortisol production

**Conclusions:**

These results provide evidence for a mechanism linking synthesis and release of cortisol with circulating glucose levels in head kidney of rainbow trout. The relationship was evident only under ACTH presence, suggesting that only under stress conditions glucose is important for the regulation of cortisol synthesis and release

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