Leptin modulates transcription of chicken GH gene in mammalian cells

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Leptin possesses variety physiological roles in mammals including regulation of growth hormone (GH) gene expression. Since caudal lobe of anterior pituitary gland consisting mainly with somatotroph expresses leptin receptor (LEPR) in chicken, leptin might modulate pituitary function, especially GH gene expression in chicken. To test this hypothesis, we analyzed whether leptin activate chicken GH (chGH) gene in vitro. We found that leptin strongly activated chGH promoter with Pit-1α, and that was independent from STAT-binding element in the chGH promoter by luciferase assay. It was also confirmed that leptin activated chGH promoter via chicken LEPR mutated tyrosine residue being essential for STAT3 activation. On the other hand, JAK2 was required for leptin-induced activation of chGH gene. Since JAK2 is known to mediate multiple serine/threonine kinases in leptin signaling, we tested effect of various serine/threonine kinases inhibitors on leptin-dependent regulation of chGH gene. CK2 inhibitor completely blocked chGH gene activation by leptin and PI3K and p42/44MAPK inhibitor decreased partially leptin-dependent chGH promoter activity. Present results may indicate that leptin regulates chGH gene expression under Pit-1α existence without activated STAT3, but with various serine/threonine kinases activated by JAK2 in chicken.