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RESEARCH ARTICLE

Molecular study of growth hormone and growth hormone receptor in Jaffarabadi buffalo

MAMTA JANMEDA AND P.H. VATALIYA[1]

Member of the Research Forum

Associate Author :
[1]Department of Animal Genetics and Breeding, Veterinay College, JUNAGADH (GUJARAT) INDIA

Author for correspondence :
MAMTA JANMEDA
Department of Animal Genetics and Breeding, College of Veterinay Science and Animal Husbandry, Anand Agricultural University, ANAND (GUJARAT) INDIA

Email : janmedamamta14@ gmail.com

Abstract : Bovine growth hormone (bGH) and growth hormone receptor loci (bGHR) plays an important regulatory function in growth and milk production.The study was conducted to find out polymorphism of different bGH and bGHR loci by using PCR-RFLP technique and to study the association of different polymorphic bGH and bGHR loci with milk production in Jaffarabadi buffalo.Genomic DNA was isolated from blood samples of 52 Jaffarabadi buffalo. DNA samples were subjected to PCR amplification using bGH and bGHR specific primers GH1, GH2, GH3 and GHR1. The PCR products of GH1 (427 bp), GH2 (891 bp), GH3 (441bp) and GHR1 (approx 640 bp) loci were digested with *Alu 1*, *Msp 1, Hae III* and *Mae II* restriction enzymes, respectively. Only AA, CC, FF and RR genotypes were found in Jaffarabadi buffalo and allelic frequencies of A, C, F and R alleles were 1.00 with absence of B, D, E and S alleles, respectively.

Key words : Buffalo, Growth hormone, Growth hormone receptor, PCR-RFLP

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INTRODUCTION

Growth hormone (GH) is a polypeptide hormone secreted by somatotroph of the anterior pituitary. Biologically it helps in body growth through rapid cell division and skeletal growth. It also influences metabolism (Neathery *et al.*, 1991), mammogenesis, galactopoiesis, lypolysis etc (Bauman and McCutcheon, 1986). Growth hormone receptor (GHR), a single-pass trans membrane protein of the cytokine receptor superfamily and is required to regulate the action of growth hormone.

Allelic variation in the structural or regulatory sequences of the GH and GHR genes would be of interest because of possible direct or indirect effects on milk production and growth performance.

Considering the limited studies that had been carried out in buffaloes using molecular genetic techniques, the present study was undertaken in buffaloes to find out polymorphism at different bGH and bGHR loci i.e. GH1 (Growth Hormone1), GH2 (Growth Hormone 2), GH3(Growth Hormone 3) and GHR1(Growth Hormone Receptor) by using PCR-RFLP technique and their association with milk production.

RESEARCH METHODOLOGY

Animals:

Experimental materials for the present study comprised of 52 blood samples of Jaffarabadi buffalo maintained at Cattle Breeding Farm, Junagadh Agriculture University in Gujarat.

DNA extraction:

The DNA was extracted by phenol- chloroform method as per method described by John *et al.* (1991). 5 ml of blood is mixed with 5 ml of solution I (Tris 10mM pH 7.6; KCl 10mM; $MgCl_2$ 10mM) and 120 µl of Nonidet P-40 (BDH) is added to lyse the cells. The solution is mixed well by inverting several times and mixture is spinned down. The supernatant is discarded and nuclear pellet is resuspended gently in 400 µl of solution II (Tris10mM pH 7.6, KCl 10mM, $MgCl_2$ 10mM, NaCl 5mM, EDTA 2mM and SDS 0.5%) to lyse the nuclei. The DNA was extracted