

## Cloning and Characterization of Porcine Uroplakini Gene

D.N. Kwon\*, K.C. Hwang, S.K. Cho, Y.S. Chon and J.H. Kim  
*Dept. of Dairy Science, Division of Applied Life Science,  
Gyeongsang National University, Chinju, Republic of Korea 660-701*

Mammalian urothelium undergoes unique membrane specialization during terminal differentiation making numerous rigid-looking membrane plaques that cover the apical cell surface, as the name asymmetric unit membrane. The AUM contains several major integral membrane proteins, including uroplakins IA, IB, II and III. Among of these uroplakins, bovine, human and mouse UP cDNA were partially or cloned completely, but not porcine. In this study, we have characterized and cloned a porcine UPII genomic gene. The partial cDNA was amplified using degenerated RT-PCR from total RNA of porcine bladder. The degenerated primer for PCR were 5-GATCCTGATTCTGCTGGCTB-3 and 5-ATGGTGGTCATCACRGTGCT-3. We screened full porcine genomic UPII gene using Lambda Genomic library (Stratagene, #097001b) with the partial cDNA as a probe and sequenced by the dideoxynucleotide termination method. Also, we have detected UPII expression by northern blotting and immunohistochemistry. In conclusion, we have cloned a porcine UPII cDNA and genomic DNA, which codes for the putative full open reading frame for the UPII protein. The deduced pig UPII 184 amino acid sequence has 93% and 90% homology in comparison with bovine UPII and human UPII proteins, respectively. These results suggested that uroplakin protein is highly conserved during mammalian evolution.

Northern and immunohistochemistry analysis showed that the pig UPII gene is highly expressed in porcine urothelium and that the protein was specifically localized in urothelial superficial cells. Taken together, our results suggest that bladder can be used as an alternative

bioreactor replaced with mammary gland .

```

          *           20           *           40           *
HUMAN  : MAPLPIQTLLIILLALLSPG-DFNTSSLSGGLLSP-LTESLLVALPPCHLTG : 55
BOVINE : MAWFWWPISWILLIILAVIVPGA-DFNTSSLSGGLLSPVMTESLLVALPPCHLTG : 56
MOUSE  : MA T EVQTLIILLAVIIPG-TDFNISSLSGGLLSP-LTESLLIALPPCHLTG : 55
PIG    : MAWFWWPIIILLAVIIPG-SDFNIGSLSGGLLSP-LTESLLVALPPCHLTG : 55
      MAs 1P6 TLplIILLILA6L PG aaDFNISSLSGGLLSPa6TESLL6ALPPCHLTG

          60           *           80           *           100           *
HUMAN  : GNATL VRRANDSKVVS FVVPFCRGRRELVSVDSCGETVTRLSAYQVTNLME : 111
BOVINE : GNATLTVRRANDSKVV G FVVPFCRGRRELVSVDSCGETVTRLSAYQVTNLAP : 112
MOUSE  : GNATL VRRANDSKVV SDFVVPFCRGRRELVSVDSCGETVTRLSAYQVTNLTE : 111
PIG    : GNATL VRRANDSEVV S FVVPFCRGRRELVSVDSCGETVTRLSAYQVTNLME : 111
      GNATLmVRRANDSKVV SsF6VPPCRGRRELVSVDSCsG5TVTRLSAYQVTNL P

          120           *           140           *           160
HUMAN  : GTRKYISYVKKGTATESS E PMSTPRR E IGLMARTGGMVVITVLLSVAM : 167
BOVINE : GTRKYISYVKKGTATESS E PMSTPRRKAE IGLAMARTGGMVVITVLLSVAM : 168
MOUSE  : GTRKYISYRVKGTATESSPETPMSTPRR E IGLMARTGGMVVITVLLSVAM : 167
PIG    : GTRKYISYVKKGTATESS E PMSTPRR E IGLMARTGGMVVITVLLSVAM : 167
      GTK5YISYIV KG sTESSrEiPMSTlPR4nmEsIGLgMARTGGMVVITVLLSVAM

          *           180
HUMAN  : FLLVGLI ALAL SRK : 184
BOVINE : FLLVGLI AL RK : 185
MOUSE  : FLLVGLI ALHWD RK : 184
PIG    : FLLVGLI AL RK : 184
      FLLV6G I ALalgaRK

```

FIG. 1. Comparison of UPII amino acid sequence.