

## Proposal for the Nomenclature of Porcine (*Sus scrofa*) $\beta$ -casein Alleles

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**Abstract.** The present research aims to compare all known  $\beta$ -casein sequences in order to propose a nomenclature that will aid future research in the field. The present research is based on field literature study, on database searches and sequence alignments. The most relevant papers describing porcine  $\beta$ -casein polymorphisms have been consulted. The major sequence repositories investigated were: GenBank and EBI (European Bioinformatics Institute).

At the moment there are nine sequences related to porcine  $\beta$ -casein present in the two major databases consulted. Five of them (AF108117, AY453035, EU242520, EU025876, EU213063) are DNA sequences, three (X54974, NM\_214434, GU827390) are cDNA sequences and one represents a transcript variant (HM114445).

**Keywords:** *Sus scrofa*,  $\beta$ -casein, CSN2, polymorphisms, alleles, nomenclature

**Introduction.** Porcine  $\beta$ -casein is a 217 amino acid protein encoded by the CSN2 gene, located on SSC8 (Şuteu, 2011). Studies conducted at protein level revealed several polymorphisms, but due to the different techniques used in polymorphism detection and to the lack of a standard nomenclature the work of these previous authors is difficult to interpret (Gallagher *et al.*, 1997).

Alexander and Beattie (1992) were the first to sequence the porcine  $\beta$ -casein cDNA. Archibald *et al.* (1994) described the first polymorphism at DNA level of this gene, a *SacI* RFLP. Recently, porcine  $\beta$ -casein came back into focus. Şuteu *et al.* (2011) described a new allele, CSN2G, characterized by the presence of a guanine in position 294 of the cDNA (c.294T>G). Cieslak *et al.* (2011) reported four new  $\beta$ -casein SNPs (c.433A>G, c.443T>G, c.294T>G, c.468C>T), the same as those inferred by Şuteu *et al.* (2011) through sequence alignments. Another recently identified SNP of porcine  $\beta$ -casein, c.175G>A, causes to an alternatively splicing phenomenon (Şuteu *et al.*, 2011a), leading to the formation of a 44 amino acid isoform (Şuteu *et al.*, 2011a, 2012).

**Aims and objectives.** The present research aims to compare all known  $\beta$ -casein sequences in order to propose a nomenclature that will aid future research in the field.

**Materials and methods.** The present research is based on field literature study, on database searches and sequence alignments. The most relevant papers describing porcine  $\beta$ -casein polymorphisms have been consulted. The major sequence repositories investigated were: GenBank and EBI (European Bioinformatics Institute).

**Results and Discussions.** At the moment there are nine sequences related to porcine  $\beta$ -casein present in the two major databases consulted. Five of them (AF108117, AY453035, EU242520, EU025876, EU213063) are DNA sequences, three (X54974, NM\_214434, GU827390) are cDNA sequences and one represents a transcript variant (HM114445).

Our proposal for a standard nomenclature is detailed in Table 1. The present study excluded two sequences, because they cover limited portions of the gene (AF108117 – EXON1; AY453035 – INTRON 7).

Proposal for porcine  $\beta$ -casein (*CSN2*) allele nomenclature

Sequence Acc. No.	Proposed name	Comments
X54974 NM_214434 EU025876	<i>CSN2A</i>	The first sequence available.
EU213063	<i>CSN2B</i>	Differences between A and B: c.435T>C; c.590G>A
EU242520	<i>CSN2C</i>	Differs from all others: c.147T>A; c.175G>A; c.433A>G
GU827390	<i>CSN2G</i>	Authors' choice. Differs from A: c.294T>G

Please note that NM\_214434 is a later version of X54974. Sequence EU025876 is similar, in regard to the coding region, with the previous two; hence all three fall in the same category.

Having in mind that this gene is highly polymorphic, the lack of a standard allele nomenclature might lead to confusion. For a detailed sequence alignment please refer to Şuteu *et al.*, 2011.

**Conclusion.** In order to facilitate future discussions related to porcine  $\beta$ -casein polymorphisms, we propose the above nomenclature system.

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