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Short communication

Molecular cloning, characterization and three-dimensional modeling of porcine nectin-2/CD112

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ABSTRACT

Nectin-2, also known as poliovirus receptor-related 2 or CD112, has been identified in many animals and plays a crucial role in cell recognition and adhesion. Here we report the identification of two porcine *Nectin-2* (poNectin-2) isoforms. The open reading frame (ORF) of 1440 nucleotides (nt) of *poNectin-2*α encodes 479 amino acids (aa). *poNectin-2*δ gene consists of 1620 nt of ORF with 539 aa. The deduced aa sequences of *poNectin-2*α and *poNectin-2*δ gene exhibit high identity with human (74% and 79%) and mouse (71% and 76%) orthologs, respectively. The ectodomains of deduced poNectin-2 protein share the structural feature of mammalian Nectin-2, including a conserved cysteine skeleton important for the formation of the three-dimensional structure. RT-PCR analysis showed that the mRNA of both poNectin-2 isoforms was broadly expressed in various tissues and cells. *poNectin-2* gene was mapped to chromosome 6q21. Information from this study will help to elucidate the Nectin-2 pathway in xenotransplant immunity.

1. Introduction

The Nectin family comprises at least four Ca^{2+}-independent immunoglobulin-like cell adhesion molecules, Nectin-1, -2, -3, and -4 (Takai and Nakanishi, 2003). Nectin-2/CD112, also known as poliovirus receptor-related 2 (PRR2), is ubiquitously expressed in cells of various tissues, including hematopoietic, neuronal, epithelial and endothelial cells (Fuchs and Colonna, 2006; Lopez et al., 1998; Reymond et al., 2004). Two different isoforms of Nectin-2 (Nectin-2α and -2δ) have been described in humans and rodents (Aoki et al., 1997; Eberle et al., 1995; Morrison and Racaniello, 1992). Recent data have indicated that Nectin-2 involved in various settings extending far beyond its traditionally associated context of virus receptor (Bottino et al., 2003; Ozaki-Kuroda et al., 2002).

As the ligand for Nectin-2, NAX accessory molecule-1 (DNAM-1) is expressed by virtually all human NK cells, T cells and monocytes (Burns et al., 1985; Kojima et al., 2003; Scott et al., 1989; Shibuya et al., 1998). DNAM-1 signaling pathway engaged by Nectin-2 may contribute to many cell–cell interactions involved events, such as mast cell–eosinophil cross-talk in allergic settings (Bachelet et al., 2006), NK cell–dendritic cell (DC) interaction in "quality

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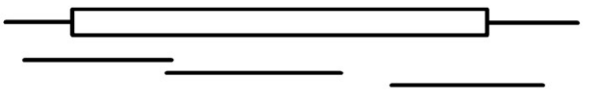
(A)



(B)

BP452295 BP147820 BX674778

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GGAACCGGCCGGGAGCCAGAGCCACCCAGGCACCTGGTCGTCCTCTCAACCGATTGGCGCTCGCAGAGTGGCCCTCAGGC 160
CCCCGCCCGGTCCCGGTCCCCCTCCCCGGGCCCCCCATGGCCCGGGCCGCAGCCCTCCCGCCGTCAAGATTGTCGCCGCC 240
                                          M  A  R  A  A  A  L  P  P  S  R  L  S  P  P
GACGCTGCCGCTACTGCCGTTGCTGCTACTACTGCTCCGGAAACCCGAGCCCAAGATGTGCGAGTTCGGGTGGCAGCTG  320
  T  L  P  L  L  P  L  L  L  L  L  L  R  E  T  R  A  Q  D  V  R  V  R  V  A  A
AGGTGCGGGCCACCTGGGGGACACCGTAGAGTTGCCGTGCCACCTGCTGCCCCCAGCACCTGAAGTCCGAGTGTCACAG  400
E  V  R  G  H  L  G  D  T  V  E  L  P  C  H  L  L  P  P  A  P  E  V  R  V  S  Q
GTGACCTGGCTGCGCCTGGACACGCCCGAGGACAACCAAAACGTGGCCATCTTCCACCCTCAGTACGGTCCCAGCTTCCC  480
 V  T  W  L  R  L  D  T  P  E  D  N  Q  N  V  A  I  F  H  P  Q  Y  G  P  S  F  P
TAGAGCGAAGCCTGGCAAGGAGCGGCTGTCCTTCGTCAAACCCGGGCAGAGCACTGGTTCCGGGCCGGGAACGGAGGTGG  560
  R  A  K  P  G  K  E  R  L  S  F  V  K  P  G  Q  S  T  G  S  G  P  G  T  E  V
AGGTGCGCGATGCCACGCTGGCCCTCCGGGGGCTGACGGTGGAGGACGAGGGCAATTACACCTGCGAGTTTGCCACCTTC  640
E  V  R  D  A  T  L  A  L  R  G  L  T  V  E  D  E  G  N  Y  T  C  E  F  A  T  F
CCCCAGGGCACCAGTCGGGGGGTGACCTGGCTCAGAGTTATAGCCGAGCCCCAGAACCACGCCGAGACCCAGGAGGTCAC  720
 P  Q  G  T  S  R  G  V  T  W  L  R  V  I  A  E  P  Q  N  H  A  E  T  Q  E  V  T
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  L  S  L  E  P  V  P  V  A  R  C  V  S  A  G  G  R  P  P  A  R  V  S  W  L  S
CCTTGGATGGGGAGACCAGAGAGAGCCAGGTGTCAGGGCCCGTGCCTGGCACAGTCACCGTCACCAGCCGCTTCACCTTG  880
P  L  D  G  E  T  R  E  S  Q  V  S  G  P  V  P  G  T  V  T  V  T  S  R  F  T  L
GTACCCTTGGGCCGAGCAGATGGTGTCAAGATCACCTGCAGAGTGGAGCACGAGAGCTTCAAGGAGCCTGTCCTGCTGCC  960
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TGTGACCCTCTCTGTGCGCTACCCCCCTGAGGTCTCCATATCTGGCTATGATGACAACTGGTACATCGGCCGTAGCGAGG 1040
  V  T  L  S  V  R  Y  P  P  E  V  S  I  S  G  Y  D  D  N  W  Y  I  G  R  S  E
CCACTCTGAACTGTGACGTTCGCAGCAAACCAGAGCCCACAGGCTACGACTGGAGCACGACCTCGGGCGTCTTCCCGGCG 1120
A  T  L  N  C  D  V  R  S  K  P  E  P  T  G  Y  D  W  S  T  T  S  G  V  F  P  A
TCAGCAGTCGCCCAGGGCCCTAAGCTGATCGTCCACTCGGTGGACAAGCTGTTCAACACGACCTTCATCTGCACGGTCAC 1200
 S  A  V  A  Q  G  P  K  L  I  V  H  S  V  D  K  L  F  N  T  T  F  I  C  T  V  T
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P  V  V  W  G  A  V  G  G  T  L  L  V  L  L  L  L  A  G  G  S  L  A  F  I  L  L
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 R  V  R  R  R  R  K  S  P  G  G  G  A  D  G  G  R  G  G  T  Y  D  D  P  K  T  Q
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  V  F  G  N  G  G  P  V  F  W  T  P  T  A  A  G  P  L  R  P  E  G  K  E  E  E
ACGAGGAGGACGAGGAGGAGAAGGGCCTCATGTTGCCCTCACCCCCGGCCATCGAGGACGACATGGAGTCCCAGCTGGAC 1600
D  E  E  D  E  E  E  E  K  G  L  M  L  P  S  P  P  A  I  E  D  D  M  E  S  Q  L  D
GGCTCTCTGATCTCCCGGCGGGCGGTTTACGTGTGACCCCCGGAGCCAGGCTGACAGAGACAGAGACCGGCCCGCCCCTG 1680
 G  S  L  I  S  R  R  A  V  Y  V  *
CCACACCGGCCAGGGGTTCCAGACTGGTTGAACTCGTTTGTCCGGTCGACTTTGGAGCTCAGATGCTACCTCCCACTTCC 1760
TTTCCTGGGATCCGGCGGGAGGTGAACGTCACACACTGGACTTCTGTCTCCAGGGCCGCATGGGGAAGGGGAGGCCGGGG 1840
GGAGCTTGGGACTGGGCACCCCCCCCACCCACCAGAGACTCGGGTTTGGCTGCAGCCTGCCCGGCCCCGTGACACTCAGG 1920
AGTTAATAAACGCCTTGGAGGAAAACATCAAAAAAAAAAAAA                                        1962
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poNectin-2δ ← Exon 7 start

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CAACGCCGTGGGCACCGGCCATGCCGAGCAAGTGGTCCTCGTTCGAGAGACGCCCAACACAGCAGGCGCAGGGGCCACAG 1280
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GTGGCATCATTGGGGGCATCATTGCTCATCATTGCTACTGCTGTGGCCGCCACGGGCATCCTCATCTGTCGGCAGCAG 1360
G  G  I  I  G  G  I  I  A  A  I  I  A  T  A  V  A  A  T  G  I  L  I  C  R  Q  Q
CGGAAGGAGCAGAGGCTGCAGGGGGCTGAGGAGGAGGAGGACCTGGAGGGGCCTCCCTCATACAAGCCGCCGACGCCCAA 1440
 R  K  E  Q  R  L  Q  G  A  E  E  E  E  D  L  E  G  P  P  S  Y  K  P  P  T  P  K
GGCGAAGCTGGAGGAGCCAGAGATGCCTTCCCAGCTCTTCACGCTGGGGGCCTCGGAGCACAGCCCGCTCAAGACTCCCT 1520
  A  K  L  E  E  P  E  M  P  S  Q  L  F  T  L  G  A  S  E  H  S  P  L  K  T  P
ACTTTGATGCTGGCGCCCCATGCCCTGAACAGGAAATGCCTCGATACCATGAGTTGCCCACCTTGGAAGAGCGGTCAGGG 1600
Y  F  D  A  G  A  P  C  P  E  Q  E  M  P  R  Y  H  E  L  P  T  L  E  E  R  S  G
CCCCTGCTGCTTGGGGCCACAAGCGTGGGGTCCCCCATCCTGGTGCCCCCAGGGCCACCTGCTGCGGAGAGGGTTTCCCT 1680
 P  L  L  L  G  A  T  S  V  G  S  P  I  L  V  P  P  G  P  P  A  A  E  R  V  S  L
GGATCTGGAGGACGAGGAGGAGGAGGAAGACTATCTGGACAAGATCAACCCCATCTATGATGCCCTGTCCTACTCCAGCC 1760
  D  L  E  D  E  E  E  E  E  D  Y  L  D  K  I  N  P  I  Y  D  A  L  S  Y  S  S
CCTCTGACTCCTACCAGGGCAAAGGGTTTGTCATGTCTCGGGCCATGTATGTGTAA                        1816
P  S  D  S  Y  Q  G  K  G  F  V  M  S  R  A  M  Y  V  *
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