

N-terminal Domain (dimerization and β-Catenin binding)

α-Catenin Domains
Nvectensis\_alpha-catenin/1-1274
Mmusculus\_alphaE-catenin/1-906
Drerio\_alphaE-catenin/1-907
Celegans\_alpha-catenin/1-927
Dmelanogaster\_alpha-catenin/1-917

α-Catenin Domains

Nvectensis\_alpha-catenin/1-1274
Mmusculus\_alphaE-catenin/1-906
Drerio\_alphaE-catenin/1-907
Celegans\_alpha-catenin/1-927
Dmelanogaster\_alpha-catenin/1-917

α-Catenin Domains

Nvectensis\_alpha-catenin/1-1274
Mmusculus\_alphaE-catenin/1-906
Drerio\_alphaE-catenin/1-907
Celegans\_alpha-catenin/1-927
Dmelanogaster\_alpha-catenin/1-917

α-Catenin Domains

Nvectensis\_alpha-catenin/1-1274
Mmusculus\_alphaE-catenin/1-906
Drerio\_alphaE-catenin/1-907
Celegans\_alpha-catenin/1-927
Dmelanogaster\_alpha-catenin/1-917

α-Catenin Domains

Nvectensis\_alpha-catenin/1-1274
Mmusculus\_alphaE-catenin/1-906
Drerio\_alphaE-catenin/1-907
Celegans\_alpha-catenin/1-927
Dmelanogaster\_alpha-catenin/1-917

α-Catenin Domains

Nvectensis\_alpha-catenin/1-1274
Mmusculus\_alphaE-catenin/1-906
Drerio\_alphaE-catenin/1-907
Celegans\_alpha-catenin/1-927
Dmelanogaster\_alpha-catenin/1-917

α-Catenin Domains

Nvectensis\_alpha-catenin/1-1274
Mmusculus\_alphaE-catenin/1-906
Drerio\_alphaE-catenin/1-907
Celegans\_alpha-catenin/1-927
Dmelanogaster\_alpha-catenin/1-917

α-Catenin Domains

Nvectensis\_alpha-catenin/1-1274
Mmusculus\_alphaE-catenin/1-906
Drerio\_alphaE-catenin/1-907
Celegans\_alpha-catenin/1-927
Dmelanogaster\_alpha-catenin/1-917

α-Catenin Domains

Nvectensis\_alpha-catenin/1-1274
Mmusculus\_alphaE-catenin/1-906
Drerio\_alphaE-catenin/1-907
Celegans\_alpha-catenin/1-927
Dmelanogaster\_alpha-catenin/1-917

α-Catenin Domains

Nvectensis\_alpha-catenin/1-1274
Mmusculus\_alphaE-catenin/1-906
Drerio\_alphaE-catenin/1-907
Celegans\_alpha-catenin/1-927
Dmelanogaster\_alpha-catenin/1-917

α-Catenin Domains

Nvectensis\_alpha-catenin/1-1274
Mmusculus\_alphaE-catenin/1-906
Drerio\_alphaE-catenin/1-907
Celegans\_alpha-catenin/1-927
Dmelanogaster\_alpha-catenin/1-917

α-Catenin Domains

Nvectensis\_alpha-catenin/1-1274
Mmusculus\_alphaE-catenin/1-906
Drerio\_alphaE-catenin/1-907
Celegans\_alpha-catenin/1-927
Dmelanogaster\_alpha-catenin/1-917

α-Catenin Domains

Nvectensis\_alpha-catenin/1-1274
Mmusculus\_alphaE-catenin/1-906
Drerio\_alphaE-catenin/1-907
Celegans\_alpha-catenin/1-927
Dmelanogaster\_alpha-catenin/1-917

M-Domain

N. vectensis insertion region

Conserved motif

Tail Domain (Actin-binding)

**SUPPLEMENTARY FIGURE 1 – Multiple alignment of *N. vectensis*  $\alpha$ -catenin aligned with characterized  $\alpha$ -catenin orthologs from *M. musculus*, *D. rerio*, *D. melanogaster*, and *C. elegans*.** Conserved domains shared between *N. vectensis*  $\alpha$ -catenin and bilaterian  $\alpha$ -catenins (blue bars) and the *N. vectensis* insert (green bars) are annotated. An 11 residue conserved motif within the insert is indicated (blue hashing), and a conserved phosphorylation site that is absent in *N. vectensis* is indicated (asterisk).

<b>Ortholog</b>	<b>Homo-dimerization</b>	<b><math>\beta</math>-Cat. binding</b>	<b>F-actin binding</b>	<b>Actin regulation</b>	<b><i>in vivo</i> requirement</b>
Mammalian $\alpha$ E-Catenin	Yes	Yes	Homodimer	Bundles F-actin; inhibits Arp2/3 and Cofilin	Adhesion in blastula; epidermal formation
<i>D. rerio</i> $\alpha$ E-Catenin	No	Yes	Monomer and heterodimer	Bundles F-actin	Epiboly and gastrulation
<i>D. melanogaster</i> $\alpha$ -Catenin	Yes	Yes	Monomer and homodimer	?	Embryogenesis and oogenesis
<i>N. vectensis</i> $\alpha$ -Catenin	Yes	Yes	Monomer and Heterodimer	Inhibits Arp2/3	?

**SUPPLEMENTARY TABLE 1** – A comparative summary of the properties of characterized  $\alpha$ -Catenin orthologs.