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APPENDEX

APPENDIX A

Table A1 Composite SSCP patterns of *PmCnn1*$_{530}$, *PmCnn1*$_{425}$, *PmCyC* and *PmCdc25* in 3-month old juveniles (BUM03)

Specimen	Gene			
	***PmCnn1*$_{530}$**	***PmCnn1*$_{425}$**	***PmCyC***	***PmCdc25***
BUM03 004	A	B	D	A
BUM03 005	A	C	D	A
BUM03 006	A	-	-	A
BUM03 007	A	B	-	A
BUM03 013	A	-	-	A
BUM03 014	A	C	A	A
BUM03 017	A	C	C	A
BUM03 019	A	-	ND	A
BUM03 021	A	C	ND	A
BUM03 025	A	C	ND	A
BUM03 026	A	C	ND	A
BUM03 027	A	C	D	A
BUM03 028	A	C	D	A
BUM03 030	A	A	B	A
BUM03 031	A	A	B	A
BUM03 034	A	A	B	A
BUM03 035	A	A	D	A
BUM03 038	A	C	C	A
BUM03 042	A	A	C	A
BUM03 043	A	F	D	A
BUM03 044	A	C	A	A
BUM03 045	A	C	D	A
BUM03 046	A	C	D	A
BUM03 048	A	C	D	A
BUM03 051	A	A	B	A
BUM03 054	A	A	D	A
BUM03 055	A	A	D	A
BUM03 056	A	-	-	A
BUM03 060	A	C	C	A
BUM03 062	A	C	C	A
BUM03 065	A	C	D	A
BUM03 067	A	A	-	A
BUM03 072	A	A	D	A
BUM03 074	A	-	-	A
BUM03 075	ND	C	C	ND
BUM03 079	ND	-	-	ND
BUM03 083	ND	-	B	ND
BUM03 090	ND	-	D	ND
BUM03 093	ND	-	D	ND
BUM03 097	ND	C	-	ND

- = No amplification product; ND = Not determined

Table A1 (Cont.)

Specimen	Gene			
	PmCnn1$_{530}$	*PmCnn1*$_{425}$	*PmCyC*	*PmCdc25*
BUM03 103	ND	C	A	ND
BUM03 104	ND	-	-	ND
BUM03 109	ND	C	-	ND
BUM03 113	ND	C	D	ND
BUM03 114	ND	C	D	ND
BUM03 117	ND	C	ND	ND
BUM03 118	ND	-	ND	ND
BUM03 119	ND	-	ND	ND
BUM03 120	ND	-	ND	ND
BUM03 121	ND	C	ND	ND
BUM03 122	ND	C	ND	ND
BUM03 124	ND	C	ND	ND
BUM03 125	ND	C	ND	ND
BUM03 128	ND	C	ND	ND
BUM03 133	ND	C	ND	ND
BUM03 134	ND	C	ND	ND
BUM03 135	ND	C	ND	ND
BUM03 145	ND	-	ND	ND
BUM03 147	ND	B	ND	ND
BUM03 148	ND	C	D	ND
BUM03 160	ND	C	-	ND
BUM03 161	ND	-	-	ND
BUM03 162	ND	E	D	ND
BUM03 164	ND	-	-	ND
BUM03 172	ND	C	-	ND
BUM03 175	ND	A	C	ND
BUM03 176	ND	C	D	ND
BUM03 177	ND	A	C	ND
BUM03 179	ND	C	-	ND
BUM03 185	ND	C	D	ND
BUM03 194	ND	D	B	ND
BUM03 198	ND	A	-	ND
BUM03 200	ND	C	C	ND
BUM03 213	ND	-	-	ND
BUM03 217	ND	C	C	ND
BUM03 219	ND	A	D	ND
BUM03 223	ND	D	C	ND
BUM03 229	ND	A	D	ND
BUM03 237	ND	H	-	ND
BUM03 239	ND	C	C	ND
BUM03 240	ND	E	D	ND
BUM03 243	ND	A	-	ND
BUM03 244	ND	D	C	ND

- = No amplification product; ND = Not determined

Table A1 (Cont.)

Specimen	Gene			
	PmCnn1$_{530}$	*PmCnn1*$_{425}$	*PmCyC*	*PmCdc25*
BUM03 246	ND	G	-	ND
BUM03 249	ND	C	B	ND
BUM03 262	ND	C	D	ND
BUM03 269	ND	-	-	ND
BUM03 272	ND	A	D	ND
BUM03 282	ND	C	-	ND
BUM03 283	ND	A	A	ND
BUM03 284	ND	D	C	ND
BUM03 286	ND	A	-	ND
BUM03 294	ND	C	-	ND
BUM03 296	ND	E	C	ND
BUM03 297	ND	-	C	ND
BUM03 313	ND	D	C	ND
BUM03 327	ND	C	-	ND
BUM03 330	ND	C	-	ND
BUM03 335	ND	A	D	ND
BUM03 336	ND	A	D	ND
BUM03 338	ND	E	C	ND

- = No amplification product; ND = Not determined

Table A2 Composite SSCP patterns of *PmCnn1*$_{530}$, *PmCnn1*$_{425}$, *PmCyC* and *PmCdc25* in 3-month old juveniles (BUM03)

Specimen	Gene			
	***PmCnn1*$_{530}$**	***PmCnn1*$_{425}$**	***PmCyC***	***PmCdc25***
SNP3A 001	III	II	III	II
SNP3A 002	II	III	II	I
SNP3A 003	II	IV	III	II
SNP3A 005	II	II	III	II
SNP3A 006	II	IV	III	II
SNP3A 008	III	III	-	-
SNP3A 009	II	III	III	II
SNP3A 010	-	IV	-	-
SNP3A 011	II	III	II	II
SNP3A 012	I	V	II	I
SNP3A 013	II	V	I	II
SNP3A 014	II	III	I	II
SNP3A 015	III	II	I	II
SNP3A 016	II	II	III	-
SNP3A 017	I	V	III	II
SNP3A 018	I	III	ND	II
SNP3A 019	II	II	ND	II
SNP3A 020	III	IV	ND	II
SNP3A 021	II	V	ND	II
SNP3A 022	II	III	III	II
SNP3A 023	II	IV	II	I
SNP3A 024	II	III	II	II
SNP3A 025	I	V	II	II
SNP3A 026	III	II	III	II
SNP3A 027	II	-	III	II
SNP3A 028	II	III	II	II
SNP3A 029	III	II	-	II
SNP3A 030	I	V	I	II
SNP3A 031	II	III	II	II
SNP3A 032	II	IV	III	II
SNP3A 033	II	IV	III	II
SNP3A 034	II	III	III	II
SNP3A 035	II	IV	III	II
SNP3A 036	III	II	II	II
SNP3A 037	I	V	III	II
SNP3A 038	II	III	I	II
SNP3A 039	II	III	-	II
SNP3A 040	I	V	II	II
SNP3A 041	I	V	III	II
SNP3A 042	III	II	II	II
SNP3A 043	I	I	II	II
SNP3A 044	III	II	II	II
SNP3A 045	II	III	III	II
SNP3A 046	II	III	II	I

- = No amplification product; ND = Not determined

Table A2 (Cont.)

Specimens	Gene/Pattern			
	PmCnn1$_{530}$	*PmCnn1*$_{425}$	*PmCyC*	*PmCdc25*
SNP3A 047	-	V	III	II
SNP3A 048	II	IV	III	II
SNP3A 049	ND	III	III	II
SNP3A 050	ND	V	III	II
SNP3A 051	ND	II	II	II
SNP3A 052	II	IV	III	II
SNP3A 053	-	I	II	-
SNP3A 054	I	V	II	II
SNP3A 059	I	V	II	II
SNP3A 061	II	III	II	II
SNP3A 062	I	V	II	II
SNP3A 064	II	III	III	II
SNP3A 067	II	III	II	II
SNP3A 078	III	II	II	II
SNP3A 082	III	II	III	II
SNP3A 083	II	IV	III	II
SNP3A 088	I	V	III	II
SNP3A 091	III	-	III	-
SNP3A 096	II	IV	III	II
SNP3A 097	II	-	II	-
SNP3A 098	II	IV	II	II
SNP3A 099	I	V	II	II
SNP3A 100	I	II	II	II
SNP3A 102	I	I	II	II
SNP3A 104	I	I	II	I
SNP3A 112	I	-	-	-
SNP3A 113	III	II	I	II
SNP3A 116	II	III	II	II
SNP3A 117	II	IV	III	II
SNP3A 118	I	V	-	II
SNP3A 119	II	III	III	II
SNP3A 120	II	IV	-	II
SNP3A 122	I	V	I	II
SNP3A 123	II	III	II	II
SNP3A 124	III	II	III	II
SNP3A 126	III	II	III	II
SNP3A 127	II	III	II	II
SNP3A 129	II	III	III	-
SNP3A 131	III	II	III	II
SNP3A 133	II	IV	II	II
SNP3A 134	I	I	II	-
SNP3A 135	II	III	II	I
SNP3A 136	II	III	III	-
SNP3A 138	I	V	III	II
SNP3A 147	ND	V	II	ND
SNP3A 148	ND	IV	II	ND
SNP3A 150	I	I	II	II

- = No amplification product; ND = Not determined

Table A2 (Cont.)

Specimens	Gene			
	PmCnn1$_{530}$	*PmCnn1*$_{425}$	*PmCyC*	*PmCdc25*
SNP3A 151	II	III	III	II
SNP3A 152	III	II	III	II
SNP3A 153	II	III	III	ND
SNP3A 155	II	IV	II	I
SNP3A 156	II	-	III	ND
SNP3A 160	II	III	II	I
SNP3A 161	II	IV	II	I
SNP3A 162	II	-	III	II
SNP3A 163	I	V	II	II
SNP3A 165	I	V	II	ND
SNP3A 172	I	V	II	II
SNP3A 173	I	-	II	II
SNP3A 175	II	V	II	II
SNP3A 176	I	I	II	ND
SNP3A 177	II	I	II	I
SNP3A 187	I	ND	II	I
SNP3A 189	ND	ND	II	ND
SNP3A 193	II	-	II	ND
SNP3A 201	II	IV	I	II
SNP3A 202	III	II	III	II
SNP3A 203	II	III	II	II
SNP3A 206	I	V	III	-
SNP3A 207	I	I	II	I
SNP3A 208	II	IV	III	II
SNP3A 209	I	V	II	I
SNP3A 211	II	III	II	I
SNP3A 213	II	IV	III	II
SNP3A 215	II	IV	III	II
SNP3A 216	I	V	II	II
SNP3A 217	II	-	II	I
SNP3A 220	II	-	II	II
SNP3A 221	II	IV	II	I
SNP3A 222	II	-	II	II
SNP3A 223	II	IV	II	II
SNP3A 224	II	V	II	II
SNP3A 227	II	IV	II	I
SNP3A 228	I	-	II	II
SNP3A 231	II	III	III	II
SNP3A 232	I	V	III	II
SNP3A 235	I	V	I	-
SNP3A 246	I	V	III	-
SNP3A 256	II	III	II	II
SNP3A 262	III	II	II	II
SNP3A 282	III	II	I	II
SNP3A 286	II	III	I	II
SNP3A 294	II	II	II	II

- = No amplification product; ND = Not determined

Table A2 (Cont.)

SNP3A sample	Gene			
	PmCnn1$_{530}$	*PmCnn1*$_{425}$	*PmCyC*	*PmCdc25*
SNP3A 296	-	-	II	-
SNP3A 297	II	IV	III	II
SNP3A 304	II	III	I	II
SNP3A 308	I	V	I	II
SNP3A 309	III	II	III	II
SNP3A 320	I	I	II	I
SNP3A 332	I	V	I	II
SNP3A 340	II	IV	III	II
SNP3A 346	I	-	II	II

- = No amplification product; ND = Not determined

Table A3 Composite SSCP patterns of *PmCnn1*$_{530}$, *PmCnn1*$_{425}$, *PmCyC* and *PmCdc25* in 5-month old juveniles (PM05)

Specimen	Gene			
	PmCnn1$_{530}$	***PmCnn1***$_{425}$	***PmCyC***	***PmCdc25***
PM05 052	1	2	2	1
PM05 053	3	-	2	1
PM05 054	1	2	2	2
PM05 055	2	1	2	1
PM05 057	2	-	2	1
PM05 058	3	1	2	1
PM05 059	1	2	1	1
PM05 060	3	1	2	1
PM05 061	4	1	1	1
PM05 067	1	2	2	2
PM05 068	2	1	2	2
PM05 069	3	2	2	1
PM05 070	2	2	1	1
PM05 071	3	-	1	1
PM05 072	2	2	1	2
PM05 073	3	2	2	2
PM05 075	2	2	1	2
PM05 076	2	2	1	1
PM05 077	2	-	1	1
PM05 083	3	2	2	1
PM05 084	2	1	1	2
PM05 088	3	1	2	1
PM05 089	4	1	1	2
PM05 090	3	ND	2	2
PM05 092	4	ND	2	2
PM05 093	1	ND	1	1
PM05 095	2	-	2	2
PM05 096	3	-	1	1
PM05 097	1	2	1	2
PM05 098	2	ND	2	2
PM05 099	3	ND	1	2
PM05 100	4	2	2	1
PM05 101	4	-	2	1
PM05 105	2	-	1	2
PM05 106	4	1	1	1
PM05 107	4	-	2	1
PM05 108	3	2	1	2
PM05 109	3	ND	2	2
PM05 110	3	1	1	2
PM05 111	3	1	2	1
PM05 112	-	1	2	1
PM05 113	1	ND	1	1
PM05 117	1	ND	2	2
PM05 118	1	ND	1	1

- = No amplification product; ND = Not determined

Table A3 (Cont.)

Specimen	Gene			
	PmCnn1$_{530}$	*PmCnn1*$_{425}$	*PmCyC*	*PmCdc25*
PM05 119	2	ND	1	1
PM05 120	2	ND	2	1
PM05 121	4	ND	2	1
PM05 122	4	1	1	2
PM05 123	3	1	2	2
PM05 124	1	2	2	2
PM05 126	4	1	2	1
PM05 128	4	ND	2	1
PM05 129	3	ND	1	1
PM05 130	2	ND	2	2
PM05 131	1	ND	ND	2
PM05 132	2	ND	ND	2
PM05 133	4	ND	ND	2
PM05 134	4	1	1	2
PM05 137	3	-	2	2
PM05 138	2	2	1	2
PM05 141	2	ND	2	2
PM05 142	4	ND	-	2
PM05 143	2	ND	1	2
PM05 146	1	ND	1	1
PM05 147	3	ND	1	2
PM05 149	3	1	2	2
PM05 153	3	1	1	2
PM05 159	1	2	1	2
PM05 169	4	1	1	2
PM05 171	4	1	2	1
PM05 181	1	2	ND	ND
PM05 187	1	2	ND	ND
PM05 190	3	1	ND	ND
PM05 194	4	1	ND	ND
PM05 196	1	2	ND	ND
PM05 197	4	2	ND	ND
PM05 206	3	1	ND	ND
PM05 209	4	1	ND	ND
PM05 210	4	1	ND	ND
PM05 215	1	2	ND	ND
PM05 221	3	1	ND	ND
PM05 223	3	1	ND	ND
PM05 232	4	1	ND	ND
PM05 233	3	1	ND	ND
PM05 235	1	2	ND	ND
PM05 242	1	2	ND	ND
PM05 243	-	-	ND	ND
PM05 245	1	2	ND	ND
PM05 259	3	1	ND	ND

- = No amplification product; ND = Not determined

Table A3 (Cont.)

Specimen	Gene			
	PmCnn1$_{530}$	*PmCnn1*$_{425}$	*PmCyC*	*PmCdc25*
PM05 266	2	2	ND	ND
PM05 272	2	2	ND	ND
PM05 275	3	1	ND	ND
PM05 277	-	1	ND	ND
PM05 280	-	2	ND	ND
PM05 283	2	-	ND	ND
PM05 288	2	-	ND	ND
PM05 291	ND	2	ND	ND
PM05 294	ND	2	ND	ND
PM05 297	2	-	ND	ND
PM05 305	ND	1	ND	ND
PM05 319	ND	1	ND	ND
PM05 324	ND	1	ND	ND
PM05 334	4	-	ND	ND
PM05 340	ND	2	ND	ND
PM05 342	ND	2	ND	ND
PM05 343	4	-	ND	ND
PM05 346	ND	2	ND	ND
PM05 349	4	ND	ND	ND
PM05 352	2	ND	ND	ND

- = No amplification product; ND = Not determined

BIOGRAPHY

Miss Sirithorn Janpoom was born on April 11, 1985 in Nakhonsawan, Thailand. She graduated with the Bachelor degree of Science (Medical Science) from the Department of Medical Science, Faculty of Medical Science, Naresuan University in 2008. She has studied for the degree of Master of Science (Biotechnology) at the Program in Biotechnology, Faculty of Science, Chulalongkorn University since 2010.

Publications from this thesis

1. **Janpoom, S.**, Khumnamtong, B., Klinbunga, S., and Menasveta, P. 2012. Development of PCR-RFLP for detection of Single Nucleotide Polymorphism in *Cyclin C* of the giant tiger shrimp *Penaeus monodon*. Proceedings of the 24th Annual Meeting of the Thai Society of Biotechnology (TSB 2012) International Conference. 29-30 November, 2012. The Sunee Grand Hotel and Convention Center, Ubon Ratchathani, Thailand (Oral presentation).

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