● 最新情報：“玉手箱” ●

最新アリル情報

小林　賢

防衛医科大学校検査部

前回の「最新アリル情報」では，MICA 遺伝子に関する塩基配列を提供した。今回は，それに関連して MICB 遺伝子の塩基配列を提供することとした。MICA 遺伝子については WHO で各アリルが正式に記載されているが，MICB 遺伝子に関しては正式な命名がなされていない。MICB 遺伝子に関して情報がまとめられているのは，Siamak が公開しているホームページ “http://mhc-x.u-strasbg.fr/” があるのみである。しかしながら，ここで公開されている内容は，MICB 遺伝子の塩基配列をアライメントにしてあるのでなく，GeneBank に直接アクセスしてデータベースを見ることができるというものである。MICB 遺伝子に関しては，その塩基配列をアライメントにして公開しているものが過去になかったということで会員から MICB アライメントの公開が要望されていた。今回，MICB 遺伝子の塩基配列を国立遺伝学研究所のデータベースと BLAST (basic local alignment search tool) を利用して相同性検索をおこない，41 種類の配列がデータベースから拾い上げられた。この 41 種類についてクラスタリングをおこない，20 種類のアリルに分類された。分類された 20 種類のアリルを Siamak が仮に命名している MICB の通し番号 (MICB001–MICB016) との対応を検討した。今回掲載した図表は，この仮番号を使用して記載することにする。ただし，MICB015 と 16 は，ホームページのアドレスエラーで検討できなかったので，MICB001 から MICB014 と，またこれに対応しないそれ以外のアリルをアクセス番号で，それぞれ掲載することにした。

表 1 は，相同性検索とクラスタリングで分類された 20 種類のアリルを Siamak の仮番号とアクセス番号でまとめたものである。MICB 遺伝子は，1152 塩基対の DNA が 6 つのエクソンにまたがって存在し，MICA 遺伝子との相同性が 94% 程度である。今回は，エクソン 2 から 5 について報告されているものと，全体が報告されているものとがあったが，基本的にエクソン 2 から 5 を主体として比較した。ただし，MICB002 はエクソン 2 から 5 の塩基配列をもとに決められているが，それと同じ配列を AF021224 がもっている。エクソン 6 について MICB002 と相同性を示す多くの報告 (AB088107, AC006046, AF021223, BX001040, BX005439) がいずれもコドン 383 が GCC であり，AF021124 のコドン 383 だけが ACC であることから，これらを別のアリルとみなした。

図 1 は，20 種類のアリルに関する塩基配列を示したものである。また，表 2 は図 1 の塩基配列から，多型性がみられた部位を拾いだしてまとめたものである。MICB 遺伝子の多型性の多くは，エクソン 2 から 4 にみられ，エクソン 1 と 5 には多型性がみられなかった。

今回掲載した MICB 遺伝子の塩基配列については，手作業で実施している部分があり，その結果，塩基配列の記載ミスがある可能性がある。もし，誤りがみられたら，著者までご一報いただければ幸いである。

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表 1 The MICB sequences previously reported

Tentative No.	Accession No.	Homologous sequences (accession No.)								
MICB001	X91625									
MICB002	SEG_AB003599S	AB088107	AC006046	AF021223	BX001040	BX005439	U95734			
MICB003	SEG_AB003600S									
MICB004	SEG_AB003601S									
MICB005	SEG_AB003602S	AB003603	AB003613	AB000878	AB000882	AF021222	AP000506	AX658223	U65416	U95729
MICB006	SEG_AB003604S									
MICB007	SEG_AB003605S	AL663061								
MICB008	SEG_AB003607S	AF021221	AL662866							
MICB009	SEG_AB003606S	U69978	U95730							
MICB010	SEG_AB003608S									
MICB011	AF021225									
MICB012	AF021226									
MICB013	U95732									
MICB014	U95731									
	AJ251156 & 57									
	AJ563706									
	AF021224									
	AJ251160 & 61									
	U95733									
	BC044218									

表 2 Polymorphic sites in the MICB gene

		Polymorphic sites (codon No.)															
		Exon 2					Exon 3			Exon 4							Exon 6
No.	Accession No.	39	68	75	80	105	121	136	193	212	215	233	243	279	290	291	383
MICB001	X91625	GAA	CCC	GAT	AAG	GAC	ATC	GAT	CGA	ACC	GAG	CGG	ACC	AGG	CAC	GGC	GCC
MICB002	SEG_AB003599S	-G-	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB003	SEG_AB003600S	-G-	---	---	---	---	---	---	---	---	---	--A	---	---	---	---	***
MICB004	SEG_AB003601S	-G-	---	---	---	---	---	---	---	---	---	---	--G	---	---	---	***
MICB005	SEG_AB003602S	-G-	---	---	G--	---	---	A--	---	---	---	---	---	---	---	---	---
MICB006	SEG_AB003604S	-G-	---	---	G--	---	---	A--	---	---	---	---	---	-A-	---	---	***
MICB007	SEG_AB003605S	-G-	---	A--	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB008	SEG_AB003607S	-G-	---	---	G--	---	--G	A--	---	---	---	---	---	---	---	---	---
MICB009	SEG_AB003606S	-G-	---	---	---	---	---	---	---	-T-	---	---	---	---	---	---	***
MICB010	SEG_AB003608S	-G-	---	---	---	---	---	---	T--	-T-	---	---	---	---	---	---	***
MICB011	AF021225	-G-	-A-	---	---	---	---	---	---	---	---	---	---	---	---	---	A--
MICB012	AF021226	-G-	---	---	---	-G-	---	---	---	---	---	---	---	---	---	---	---
MICB013	U95732	-G-	---	---	---	---	---	---	---	---	---	---	---	---	--T	---	***
MICB014	U95731	-G-	---	---	---	---	---	---	---	---	---	---	---	---	---	---	***
	AJ251156 & 57	-G-	---	---	G--	---	---	A--	---	---	---	---	---	---	---	A--	***
	AJ563706	-G-	---	---	G--	---	---	A--	---	---	A--	---	---	---	---	A--	***
	AF021224	-G-	---	---	---	---	---	---	---	---	---	---	---	---	---	---	A--
	AJ251160 & 61	-G-	---	---	---	---	---	---	---	---	---	--A	---	---	---	A--	***
	U95733	-G-	---	---	---	---	---	---	---	---	A--	---	---	---	---	---	***
	BC044218	-G-	---	---	G--	---	...	...	---	---	---	---	---	---	---	---	---

Tentative or Accession No.	Exon 1 1 1									10										60 20
MICB001	ATG	GGG	CTG	GGC	CGG	GTC	CTG	CTG	TTT	CTG	GCC	GTC	GCC	TTC	CCT	TTT	GCA	CCC	CCG	GCA
MICB002	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB003	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB004	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB005	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB006	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB007	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB009	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB010	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB011	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB012	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB013	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB014	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
AF021224	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
AJ251156	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
AJ251160	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
AJ563706	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
BC044218	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
U95733	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***

	61 21	Exon 1		Exon 2						30										120 40
MICB001	GCC	GCC	GCT	GAG	CCC	CAC	AGT	CTT	CGT	TAC	AAC	CTC	ATG	GTG	CTG	TCC	CAG	GAT	GAA	TCT
MICB002	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-G-	---
MICB003	***	***	***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-G-	---
MICB004	***	***	***	*--	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-G-	---
MICB005	---	---	---	*--	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-G-	---
MICB006	***	***	***	*--	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-G-	---
MICB007	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-G-	---
MICB008	---	---	---	*--	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-G-	---
MICB009	***	***	***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-G-	---
MICB010	***	***	***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-G-	---
MICB011	***	***	***	*--	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-G-	---
MICB012	***	***	***	*--	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-G-	---
MICB013	***	***	***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-G-	---
MICB014	***	***	***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-G-	---
AF021224	***	***	***	*--	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-G-	---
AJ251156	***	***	***	*--	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-G-	---
AJ251160	***	***	***	*--	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-G-	---
AJ563706	***	***	***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-G-	---
BC044218	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-G-	---
U95733	***	***	***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-G-	---

	121 41									50										180 60
MICB001	GTG	CAG	TCA	GGG	TTT	CTC	GCT	GAG	GGA	CAT	CTG	GAT	GGT	CAG	CCC	TTC	CTG	CGC	TAT	GAC
MICB002	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB003	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB004	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB005	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB006	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB007	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB010	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB011	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB012	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB013	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB014	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AF021224	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AJ251156	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AJ251160	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AJ563706	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
BC044218	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
U95733	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Tentative or Accession No.	181																			240
	61									70										80
MICB001	AGG	CAG	AAA	CGC	AGG	GCA	AAG	CCC	CAG	GGA	CAG	TGG	GCA	GAA	GAT	GTC	CTG	GGA	GCT	AAG
MICB002	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB003	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB004	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB005	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	G--
MICB006	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	G--
MICB007	---	---	---	---	---	---	---	---	---	---	---	---	---	---	A--	---	---	---	---	---
MICB008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	G--
MICB009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB010	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB011	---	---	---	---	---	---	---	-A-	---	---	---	---	---	---	---	---	---	---	---	---
MICB012	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB013	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB014	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AF021224	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AJ251156	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	G--
AJ251160	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AJ563706	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	G--
BC044218	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	G--
U95733	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

	241																			300
	81									90										100
MICB001	ACC	TGG	GAC	ACA	GAG	ACC	GAG	GAC	TTG	ACA	GAG	AAT	GGG	CAA	GAC	CTC	AGG	AGG	ACC	CTG
MICB002	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB003	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB004	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB005	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB006	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB007	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB010	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB011	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB012	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB013	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB014	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AF021224	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AJ251156	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AJ251160	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AJ563706	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
BC044218	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
U95733	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

										Exon 2										Exon 3										360
	301																													
	101																			110										120
MICB001	ACT	CAT	ATC	AAG	GAC	CAG	AAA	GGA	GGC	TTG	CAT	TCC	CTC	CAG	GAG	ATT	AGG	GTC	TGT	GAG
MICB002	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB003	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB004	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB005	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB006	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB007	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB010	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB011	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB012	---	---	---	---	-G-	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB013	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB014	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
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Tentative or Accession No.	361																			420
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MICB001	ATC	CAT	GAA	GAC	AGC	AGC	ACC	AGG	GGC	TCC	CGG	CAT	TTC	TAC	TAC	GAT	GGG	GAG	CTC	TTC
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MICB002	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
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Tentative or Accession No.	541																			600
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MICB001	ATC	ACC	GTG	ACA	TGC	AGG	GCT	TCC	AGC	TTC	TAT	CCC	CGG	AAT	ATC	ACA	CTG	ACC	TGG	CGT
MICB002	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
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MICB001	AAT	GGA	ACC	TAC	CAG	ACC	TGG	GTG	GCC	ACC	AGG	ATT	CGC	CAA	GGA	GAG	GAG	CAG	AGG	TTC
MICB002	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
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BC044218	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
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MICB001	ACC	TGC	TAC	ATG	GAA	CAC	AGC	GGG	AAT	CAC	GGC	ACT	CAC	CCT	GTG	CCC	TCT	GGG	AAG	GCG
MICB002	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB003	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB004	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB005	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB006	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB007	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB010	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB011	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB012	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB013	---	---	---	---	---	---	---	---	---	--T	---	---	---	---	---	---	---	---	---	---
MICB014	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AF021224	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AJ251156	---	---	---	---	---	---	---	---	---	---	A--	---	---	---	---	---	---	---	---	---
AJ251160	---	---	---	---	---	---	---	---	---	---	A--	---	---	---	---	---	---	---	---	---
AJ563706	---	---	---	---	---	---	---	---	---	---	A--	---	---	---	---	---	---	---	---	---
BC044218	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
U95733	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Tentative or Accession No.	901																			960
	301									310										320
MICB001	CTG	GTG	CTT	CAG	AGT	CAA	CGG	ACA	GAC	TTT	CCA	TAT	GTT	TCT	GCT	GCT	ATG	CCA	TGT	TTT
MICB002	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB003	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB004	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB005	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB006	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB007	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB009	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB010	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB011	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB012	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB013	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB014	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AF021224	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AJ251156	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AJ251160	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AJ563706	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
BC044218	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
U95733	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

	961																			1020
	321									330										340
MICB001	GTT	ATT	ATT	ATT	ATT	CTC	TGT	GTC	CCT	TGT	TGC	AAG	AAG	AAA	ACA	TCA	GCG	GCA	GAG	GGT
MICB002	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB003	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB004	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB005	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB006	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB007	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB008	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
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MICB010	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB011	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB012	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB013	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB014	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AF021224	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AJ251156	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AJ251160	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AJ563706	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
BC044218	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
U95733	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

	Exon 5		Exon 6																	
	1021																			1080
	341									350										360
MICB001	CCA	GAG	CTT	GTG	AGC	CTG	CAG	GTC	CTG	GAT	CAA	CAC	CCA	GTT	GGG	ACA	GGA	GAC	CAC	AGG
MICB002	---	-**	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB003	---	-**	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB004	---	-**	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB005	---	-**	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB006	---	-**	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB007	---	-**	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB008	---	-**	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB009	---	-**	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB010	---	-**	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB011	---	---	---	---	---	---	---	---	---	---	---	---	---	***	***	***	***	***	***	***
MICB012	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB013	---	-**	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB014	---	-**	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
AF021224	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AJ251156	---	-**	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
AJ251160	---	-**	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
AJ563706	---	-**	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
BC044218	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
U95733	---	-**	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***

Tentative or Accession No.	1081																			1140
	361									370										380
MICB001	GAT	GCA	GCA	CAG	CTG	GGA	TTT	CAG	CCT	CTG	ATG	TCA	GCT	ACT	GGG	TCC	ACT	GGT	TCC	ACT
MICB002	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB003	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB004	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB005	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB006	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB007	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB008	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB009	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB010	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB011	***	***	***	***	***	***	***	***	***	---	---	---	---	---	---	---	---	---	---	---
MICB012	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MICB013	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
MICB014	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
AF021224	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AJ251156	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
AJ251160	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
AJ563706	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
BC044218	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
U95733	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***

			Exon 6	
	1141		1152	
	381		383	
MICB001	GAG	GGC	GCC	TAG
MICB002	***	***	***	***
MICB003	***	***	***	***
MICB004	***	***	***	***
MICB005	***	***	***	***
MICB006	***	***	***	***
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MICB013	***	***	***	***
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AF021224	---	---	A--	---
AJ251156	***	***	***	***
AJ251160	***	***	***	***
AJ563706	***	***	***	***
BC044218	---	---	---	---
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図1