Joint International Tropical Medicine Meeting
JITMM VIRTUAL 2021
Poster No. 49

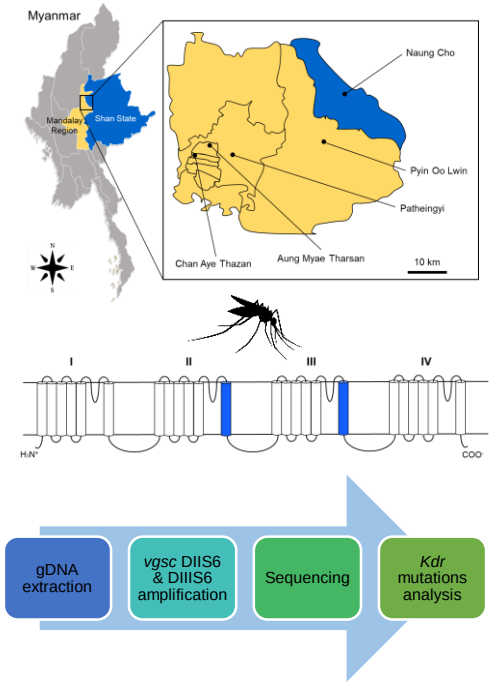
KNOCKDOWN RESISTANCE MUTATIONS IN THE VOLTAGE-GATED SODIUM CHANNEL OF MYANMAR *AEDES AEGYPTI* MOSQUITOES

Tuấn Cường Võ[1,2], Haung Naw[1,2], Hương Giang Lê[1,2], Jung-Mi Kang[1,2], Yi Yi Mya[3], Moe Kyaw Myint[3], Byoung-Kuk Na[1,2]*

INTRODUCTION

Aedes aegypti is an important vector transmitting diverse arboviral pathogens in Myanmar. Pyrethroid insecticides have been widely employed in Myanmar as the primary control measure for the mosquito species, but the indiscriminate use of the insecticide has increased concern of insecticide resistance. Knockdown resistance (*kdr*) mutations in the voltage-gated sodium channel (*vgsc*) are known to confer pyrethroid resistance to *Ae. aegypti*.

METHODS



RESULTS

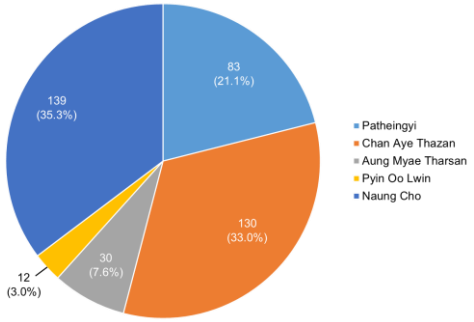


Figure 1. Regional distribution of *vgsc* fragments. A total of 394 sequences for DII-S6 and DIII-S6 of *vgsc* were successfully obtained from 394 Myanmar *Ae. aegypti* mosquitoes.

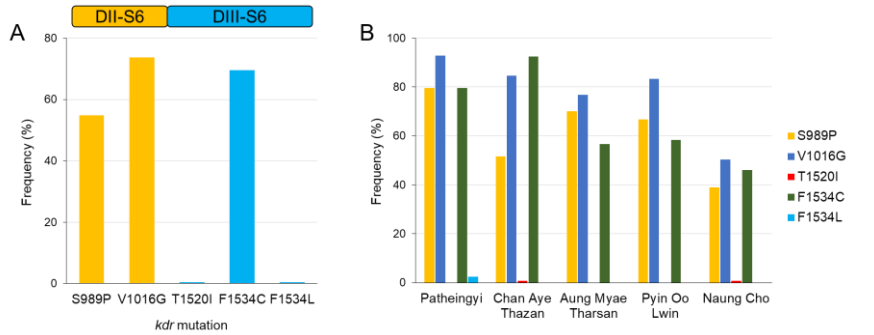


Figure 2. Frequencies of major *kdr* mutations associated with pyrethroid resistance in *Ae. aegypti* population collected in Mandalay area, Myanmar. **(A)** Frequencies of major *kdr* mutations detected in *vgsc* DII-S6 and DIII-S6 of Myanmar *Ae. aegypti* population. **(B)** Frequencies of major *kdr* mutations detected in Myanmar *Ae. aegypti* population collected at 5 townships, Mandalay area, Myanmar.

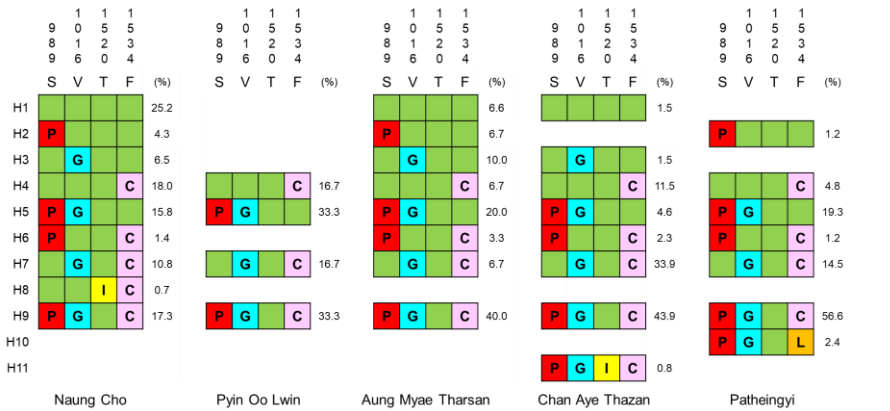


Figure 3. Patterns and frequencies of *vgsc* haplotypes based on major *kdr* mutations in *Ae. aegypti* *vgsc* from 5 study sites. Single or co-occurrent *kdr* mutations in the *vgsc* DII-S6 and DIII-S6 generated 11 distinct haplotypes of the gene. Patterns and frequencies of each haplotype were differed by study site.

Table 1. Minor mutations found in *vgsc* DII-S6 and DIII-S6 of Myanmar *Ae. aegypti*

Domain	Mutation	Patheingyi (n = 83)	Chan Aye Thazan (n = 130)	Aung Myae Tharsan (n = 30)	Pyin Oo Lwin (n = 12)	Naung Cho (n = 139)	Total (n = 394)
DII-S6	D960G		1	1			2
	M972I					2	2
	I977T			1		2	3
	E985G		2				2
	I987N			2			2
	D998G	2					2
	F1020S	4	20	2	2	22	50
DIII-S6	V1512A				2		2
	K1514E					5	5
	M1524V	1	2				3
	Y1527F		1			2	3
	Y1527C	4					4
	I1533T	2					2
	I1544V	2				1	3
	E1553G		9	1			10
	G1581D	1	1				2

CONCLUSION

High frequencies of *kdr* mutations were observed in Myanmar *Ae. aegypti*, implying a high level of pyrethroid resistance in the population. These findings warrant that the current vector control program in Myanmar should be carefully reconsidered for effective *Ae. aegypti* control.

[1]*Department of Parasitology and Tropical Medicine, Gyeongsang National University College of Medicine, Republic of Korea*
[2]*Department of Convergence Medical Science, Gyeongsang National University, Republic of Korea*
[3]*Department of Medical Research Pyin Oo Lwin Branch, Pyin Oo Lwin, Myanmar*