COMPARATIVE ANALYSIS OF PREDICTED ANTIGENIC GENE VARIATION AMONG ANNUALLY ISOLATED RSIV STRAINS

Gukhyun Kim* and Kwang-Il Kim

Department of Aquatic Life Medicine, Pukyong National University
Busan 48513, Republic of Korea
Gukhyun8055@gmail.com

INTRODUCTION

- Red sea bream iridovirus (RSIV) is a major viral pathogen in marine aquaculture and causes substantial economic losses.
- Antigenic variation among field isolates may affect vaccine efficacy and immune recognition.
- This study aimed to compare predicted antigenic ORFs among RSIV isolates collected annually from 2019 to 2025 using an *in silico* approach.

MATERIALS AND METHODS

ORF extraction
All annotated ORFs from RSIV Ehime-1 reference genome were obtained.

Antigenicity prediction
VaxiJen v2.0 was used to predict antigenicity of all ORFs.

ORF selection
ORFs with antigenicity score ≥ 0.6 were selected. Eight ORFs were included.

Sequence alignment
Amino acid sequences of annual RSIV isolates (2019–2025) were aligned.

Comparative analysis
Pairwise identity (%) and predicted antigenicity scores were analyzed and visualized.

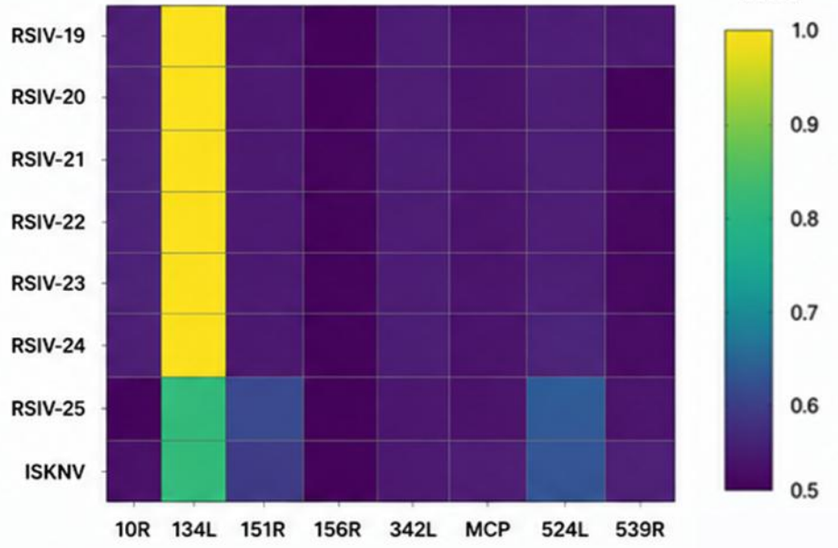
RESULTS AND DISCUSSION

Table 1. Pairwise comparison of deduced amino acid sequence identity (%) for ORF 539R among RSIV isolates collected from 2019 to 2025.

	RSIV-19	RSIV-20	RSIV-21	RSIV-22	RSIV-23	RSIV-24	RSIV-25
RSIV-19	100	99.53	98.59	99.53	99.53	99.53	99.53
RSIV-20	-	100	99.06	100	100	100	100
RSIV-21	-	-	100	100	100	100	100
RSIV-22	-	-	-	100	100	100	100
RSIV-23	-	-	-	-	100	100	100
RSIV-24	-	-	-	-	-	100	100
RSIV-25	-	-	-	-	-	-	100

- ORF 539R showed minor but distinguishable sequence variation.
- Amino acid identity between RSIV-19 and RSIV-21 was 98.59%, whereas RSIV-19 and RSIV-20, -22, -23, -24, and -25 shared 99.53% identity.
- RSIV-21 showed 99.06% identity compared with RSIV-20 and other isolates.
- All strains maintained antigenicity scores above the 0.6 threshold.

Figure 1. Predicted antigenicity scores of selected ORFs across RSIV and ISKNV strains.



Predicted antigenicity scores of selected ORFs across RSIV and ISKNV strains. Heatmap representing VaxiJen v2.0–predicted antigenicity scores for eight selected ORFs. Rows correspond to viral strains and columns correspond to ORFs. The color scale indicates antigenicity score values.

CONCLUSION

- Predicted antigenic ORFs were highly conserved among annual RSIV isolates collected from 2019 to 2025.
- Although minor sequence variation was identified in ORF 539R, no meaningful differences in predicted antigenicity were observed among isolates.
- These results indicate limited antigenic drift at the amino acid level and support the use of conserved RSIV antigens for vaccine-related applications and future antigenic studies.