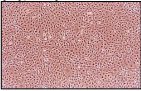




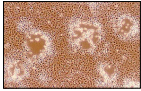


### Characterization

- **Cytopathic effect (CPE)**
  - Observed on *Epithelioma papulosum cyprini* (EPC) cell line
  - Round



Negative



Infect

- **Icosahedral nucleocapsid, average diameter = 128 nm**

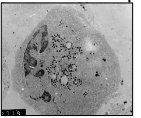
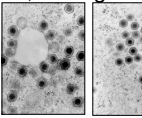
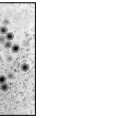




Photo credit: Kanchanakhan et al. 1999, 2002

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### Outbreaks in Thai Fish Farms

- **Outbreak reported in 2005 in a facility for ornamental fish**
  - **Slender goby** (*Oxyeleotris marmorata*)
    - ✦ Nakhon Pathom
- **Cases reported in 2005 in a facility for ornamental fish**
  - **Suppy** (*Poecilia reticulata*)
    - ✦ Samut Sakhon (AAHRI Report)
  - **2002 Goldfish** (*Carassius auratus*)
    - ✦ Bangkok (Saduakdee 2002)



<http://www.visit-thailand.org>

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### Clinical Findings

- **Gross pathology**
  - Skin ulceration
  - No consistent bacteria or external parasites observed




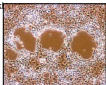



Photo credit: Dr. Prasankok et al. 2005

- **Virus isolation (MSGIV, GPV, GFV)**
  - CPE: Observed on EPC cell line
  - Round lytic plaque



Negative



Infected

- **Ultrastructural Characterization**
  - Icosahedral nucleocapsid
  - Average diameter = 132.5 nm

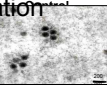
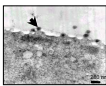



Photo credit: Prasankok et al. 2005

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### (PCR)

- DNA extraction from diseased fish and animal tissues
  - Liver, kidney, spleen, and skin ulcer
- PCR targeting the ranavirus major capsid protein (Mao et al. 2005)
  - 300 bp

**Result: Marbled sleeper goby isolate and previous isolates of frog ranaviruses are positive for the ranavirus**

Prasankok et al. 2005

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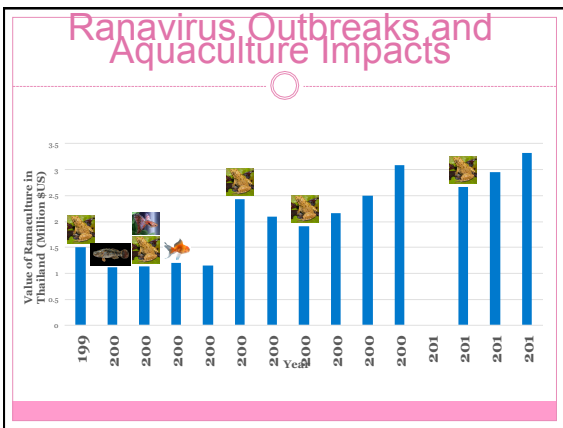
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### Objectives

- Characterize the ranaviruses isolated from marbled sleeper goby, goldfish, and guppy in Thailand
- Identify phylogenetic relationships between ranaviruses in fish and amphibians determined in Asia

wildherps.com

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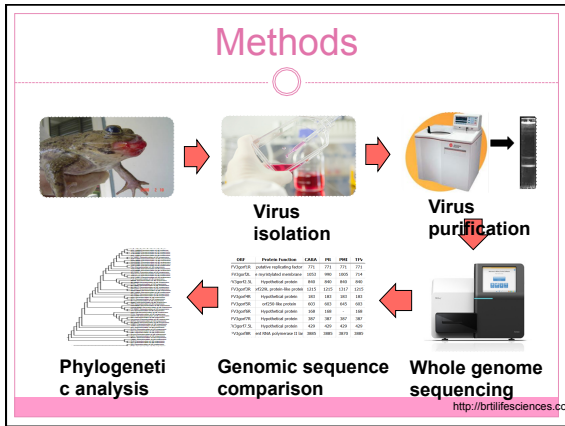
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### Comparison

- The full genomes of marbled sleeper goby iridovirus (MSGIV), goldfish iridovirus (GFIV), and guppy iridovirus (GPV) were sequenced using an Illumina MiSeq Next Generation Sequencing platform
- Annotation of MSGIV, GFIV, and GPV genomes
- Comparison of all annotated Thai ranaviruses versus Chinese (TFV, STV) and American (FV3) isolates
- Results:
  - Thai ranaviruses and TFV have 6 less genes than FV3
    - FV3gorf13R, FV3gorf30R, FV3gorf44R, FV3gorf49L, FV3gorf58R, FV3gorf98R
  - TFV is more closely related to Thai ranaviruses than FV3

2008, Gary Nafis

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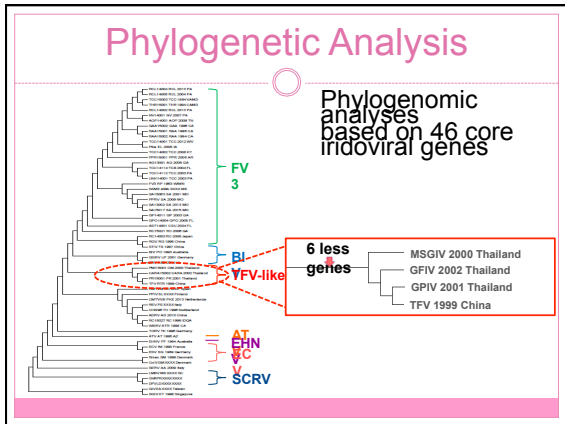
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## Conclusions

- Phylogenomic analyses and genomic sequence comparison revealed that ranaviruses isolated from food and ornamental fish in Thailand are closely related to TFV isolated from the tiger frog (*H. tigerinus*) in China
  - TFV clade (MSGIV, GFIV, and GPV) is supported by the 6 less genes when compared to FV3
- Interclass transmission of TFVs occurs among fish and amphibians in Asia has negatively impact Asian aquatic animal industries
- Dissemination of TFVs between China and

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## Future Directions

- Unravel the epidemiology of TFVs in Asia (Thailand and China)
  - Sequence early TFVs from amphibian outbreaks in Thailand
- Develop: 1) a better understanding of the impact of TFVs on Asian aquatic animal industries and 2) mitigation strategies
- Challenge studies

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## Acknowledgements

### WAVDL, University of Florida

- Dr. Waltzek
- Dr. Subramaniam
- Dr. Steckler
- Patrick Thompson
- WAVDL buddies



### Department of Fisheries, Thailand

- Dr. Kanchanakhan
- Jaree Polchana



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