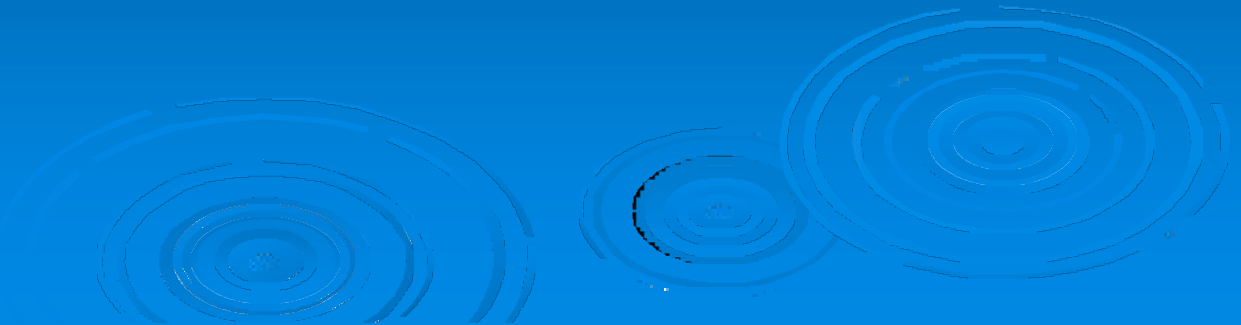


Collaborations between Biologists and Veterinarians yield Insights into Marine Turtle Fibropapillomatosis

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2. Golden Honu Services of Oceania



The Sea Turtle Stranding Research Network in the Hawaiian Islands

夏威夷群島的擱淺海龜研究網絡



by

George H. Balazs

Marine Turtle Research Program 海龜研究計畫

NOAA Fisheries 海氣局漁科中心

PIFSC MARINE TURTLE RESEARCH

太平洋島嶼漁業科學中心的海龜研究

- Stranding, salvage and necropsy research for long term population dynamics data collection

擱淺、搶救與解剖研究，以長期蒐集種群動態的資料



PIFSC MARINE TURTLE RESEARCH

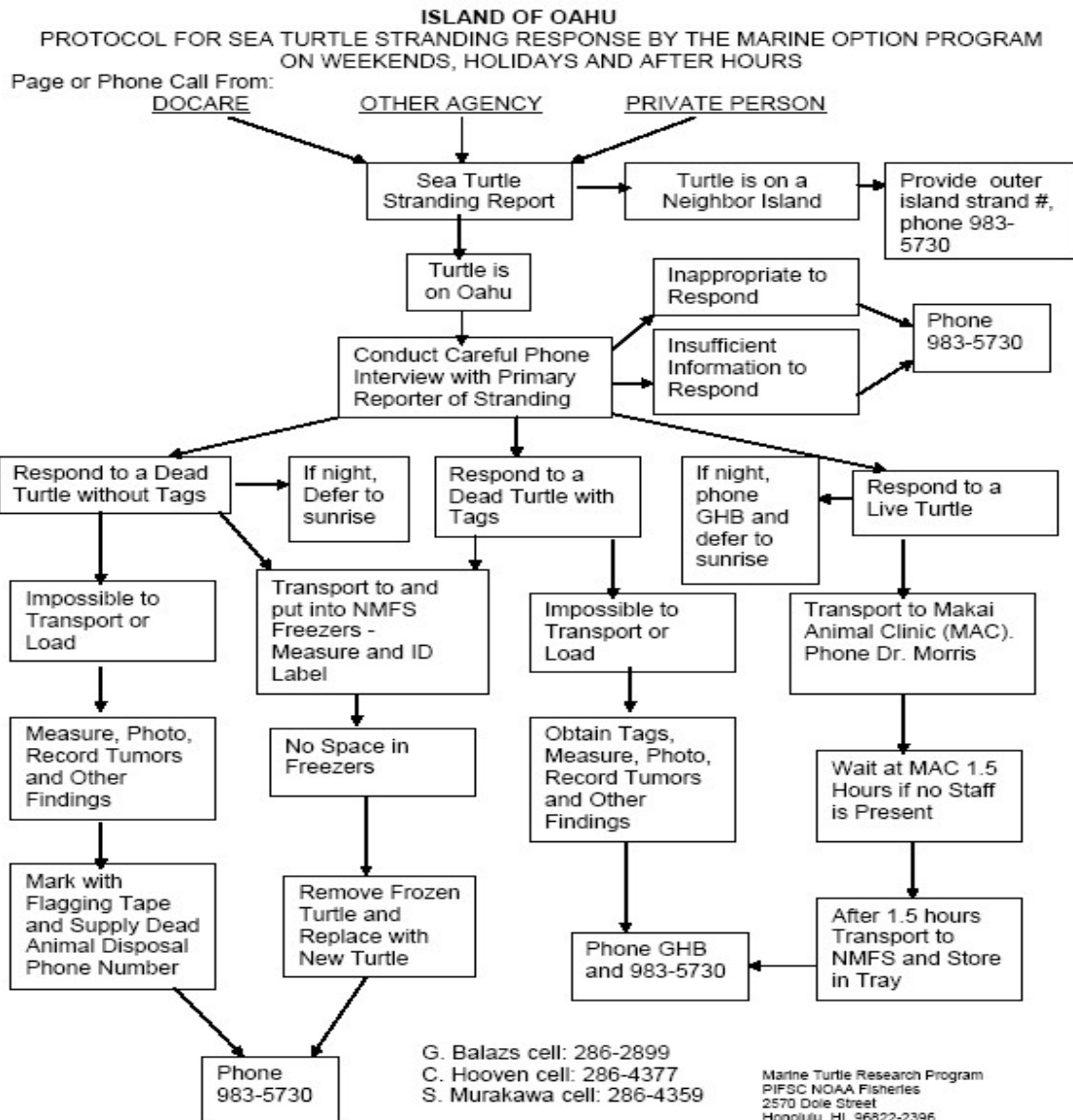
太平洋島嶼漁業科學中心的海龜研究

Health assessments including fibropapilloma disease complex
健康評估，其中包含纖維狀乳凸瘤疾病綜合症



Flowchart

海龜擱淺應變流程圖



Note: Illegal activities involving sea turtles should be reported to DOCARE (587-0077) and/or NMFS Law Enforcement (541-2727)

Types of
stranding cases
in Hawaii
夏威夷的擱淺
案例種類

Canal
河道





Beach Shoreline

海岸沙灘





Examine plastron for body condition

檢驗腹甲以確定身體狀況

08.07.2006

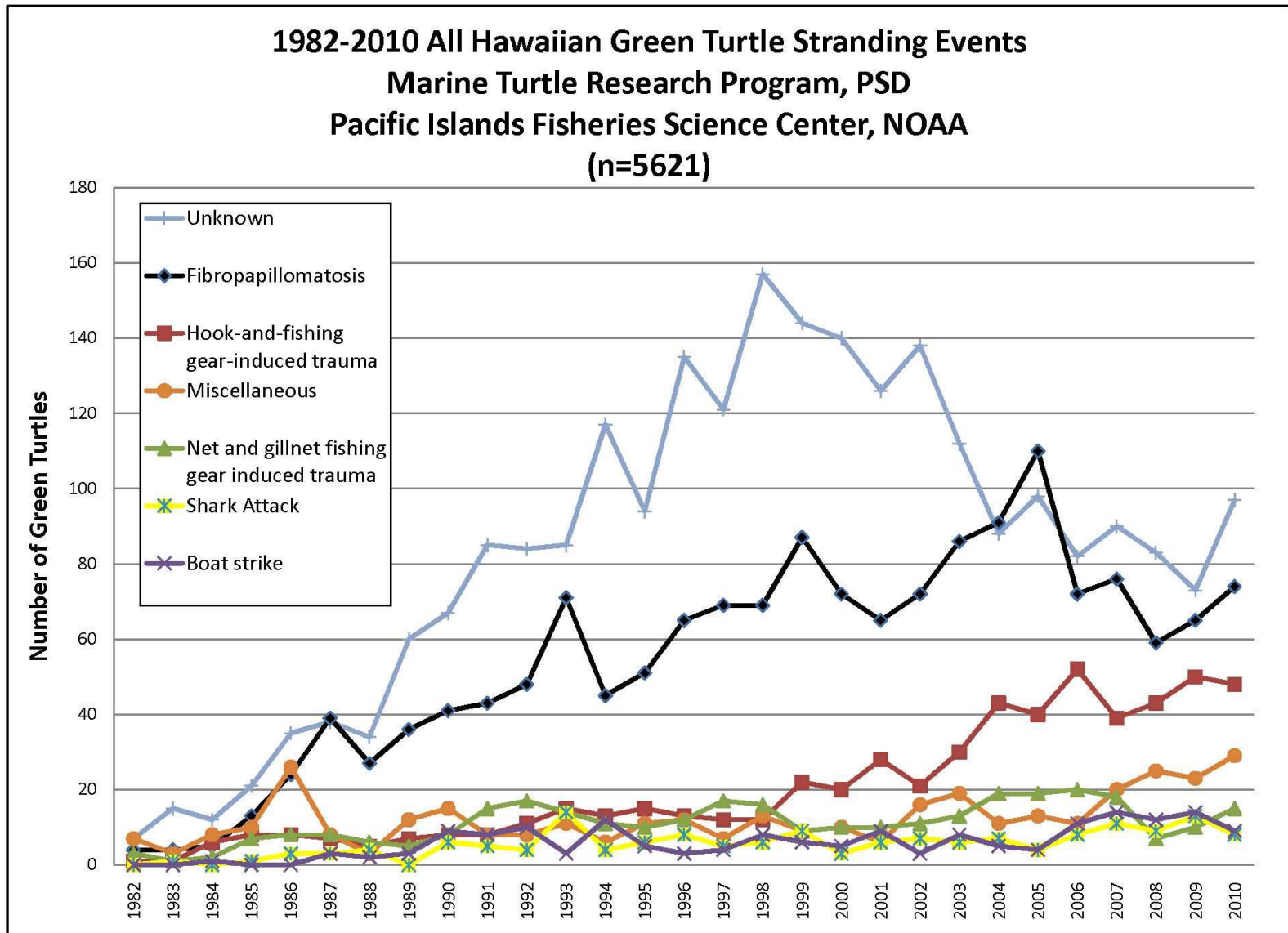
Fishing line entanglement 魚線纏繞



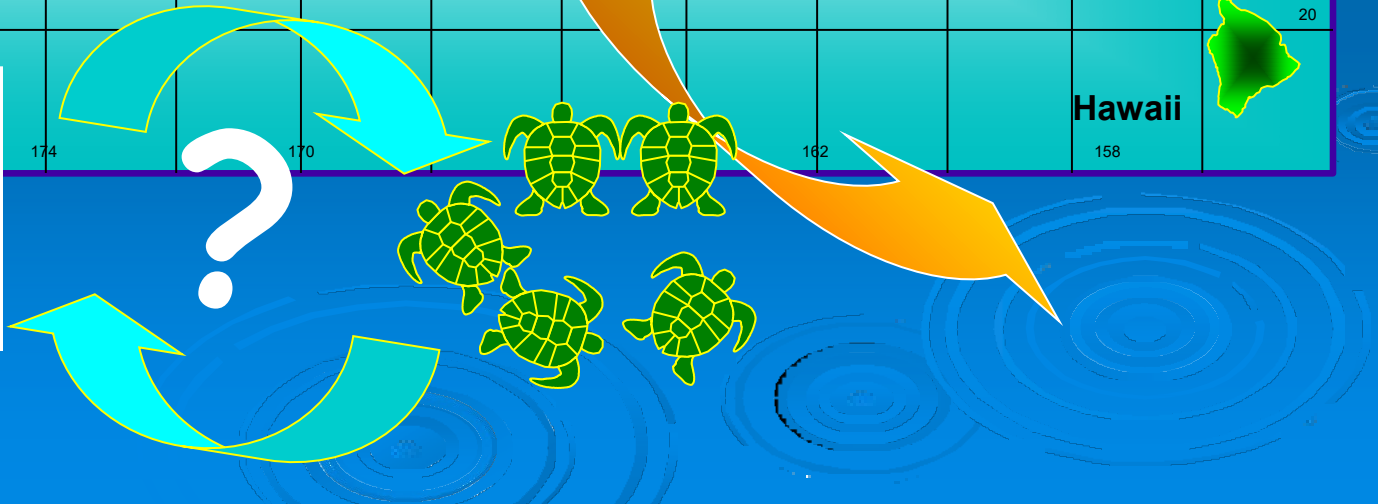
Summary of important points 重點摘要

- Details on turtle strandings have been collected in Hawaii since 1982
夏威夷自1982年起就開始蒐集海龜擱淺的相關資料
- 97% of the strandings are green turtles // 97%的擱淺個案涉及綠蠔龜
- Flowcharts provide stranding protocols for responding // 流程圖提供了擱淺事件的處理程序
- 250-300 turtles strand each year // 每年約250至300頭海龜擱淺
- 30% of the turtles are alive // 海龜的存活率為30%
- A clinical veterinarian, Dr. Bob Morris, treats the turtles
臨床獸醫Bob Morris醫師負責治療海龜
- A turtle pathologist, Dr. Thierry Work, conducts necropsy research
海龜病理學家Thierry Work博士負責解剖研究
- Causes of strandings include tumor disease, fishing line and hooks, nets, boat collision, shark attack, and miscellaneous. 擱淺的原因包括腫瘤、魚絲及魚鉤、魚網、船隻碰撞、鯊魚攻擊等等

1982-2010年期間綠蠔龜在夏威夷群島的擱淺事件



Green turtles in Hawaii



NECROPSY AND IN WATER STUDIES YIELD DIFFERENT INFORMATION



NECROPSY



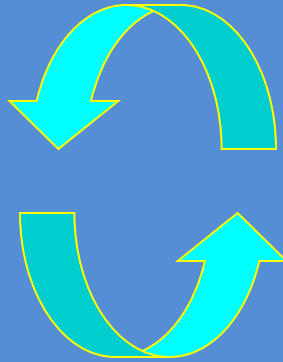
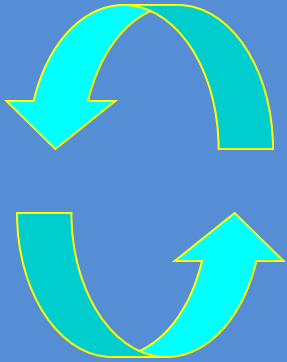
IN-WATER

NECROPSY OF LONGLINE BYCATCH FOR PELAGIC TURTLE HEALTH



Pelagic

Near shore



OCEAN

ISLAND



Marine turtle fibropapillomatosis

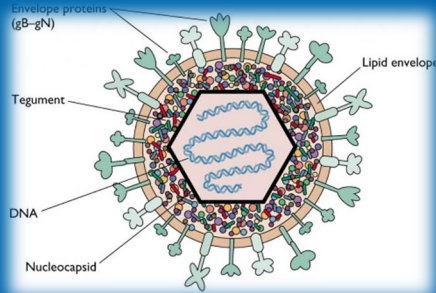


Tumor distribution- *Dis Aquatic Org* 62:163-176
Euthanasia methods-*Mar Turtle News* 136:5-6



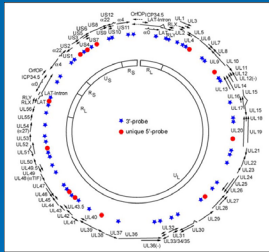
Finding chelonid herpes virus 5

FP associated with herpesvirus



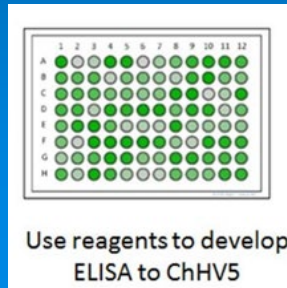
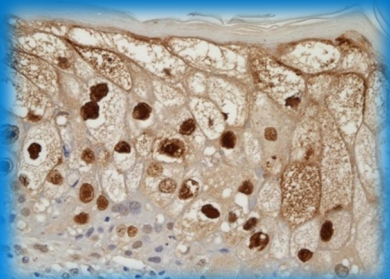
Virology 246:392-399
 Virology 287:105-111
 J Virol 79:1125-1132
 J Zoo Wildl Med 36:527-230

Sequencing of viral genome



PLOS One 7:e46623
 PeerJ 2018:4386

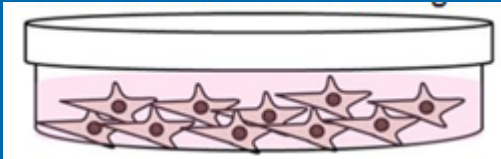
Generation of artificial peptides for ELISA and IHC





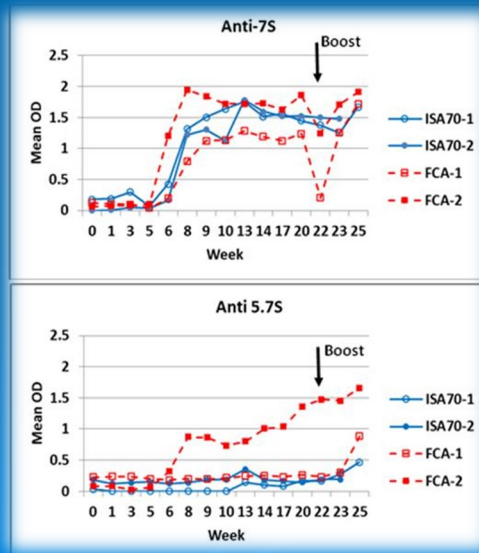
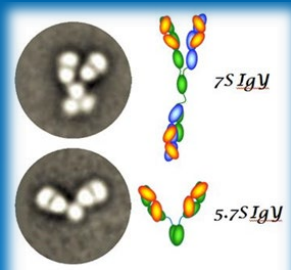
Generation of laboratory tools

Sea turtle cell lines to try and culture virus



Methods in Cell Science 19:161-168
In Vitro Cell Dev Biol. 35:389-393
J Gen Virol 90:1943-1950

Monoclonal antibodies to assess immune response

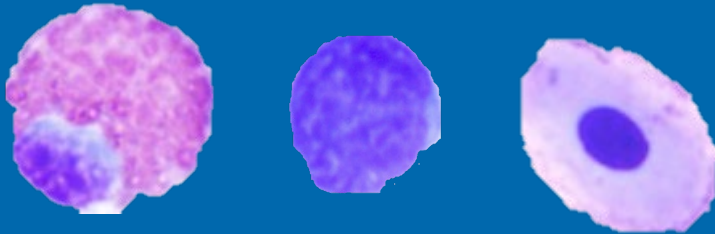


Vet Immunol Immunopathol 74:179-194
J Immunol 195:5452-5456



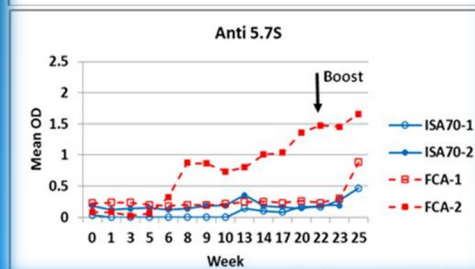
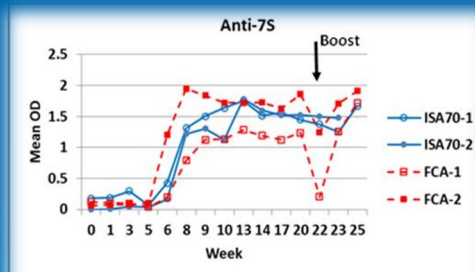
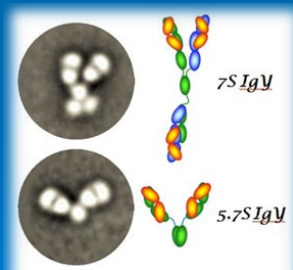
Generation of laboratory tools

Characterizing blood cells and cell mediated response



Vet Immunol Immunopathol 131:211-217
Am J Vet Res 59:1252-1257

Monoclonal antibodies to assess humoral immune response



Vet Immunol Immunopathol 74:179-194
J Immunol 195:5452-5456



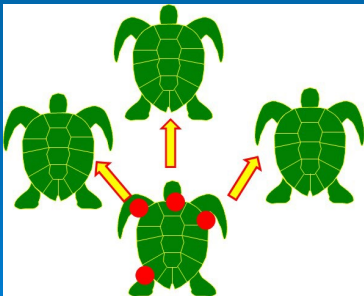
Insights to FP epidemiology

ChHV5 may be vectored by leeches



Virology 321:101-110

Virus shedding from tumors infrequent but superspreaders involved

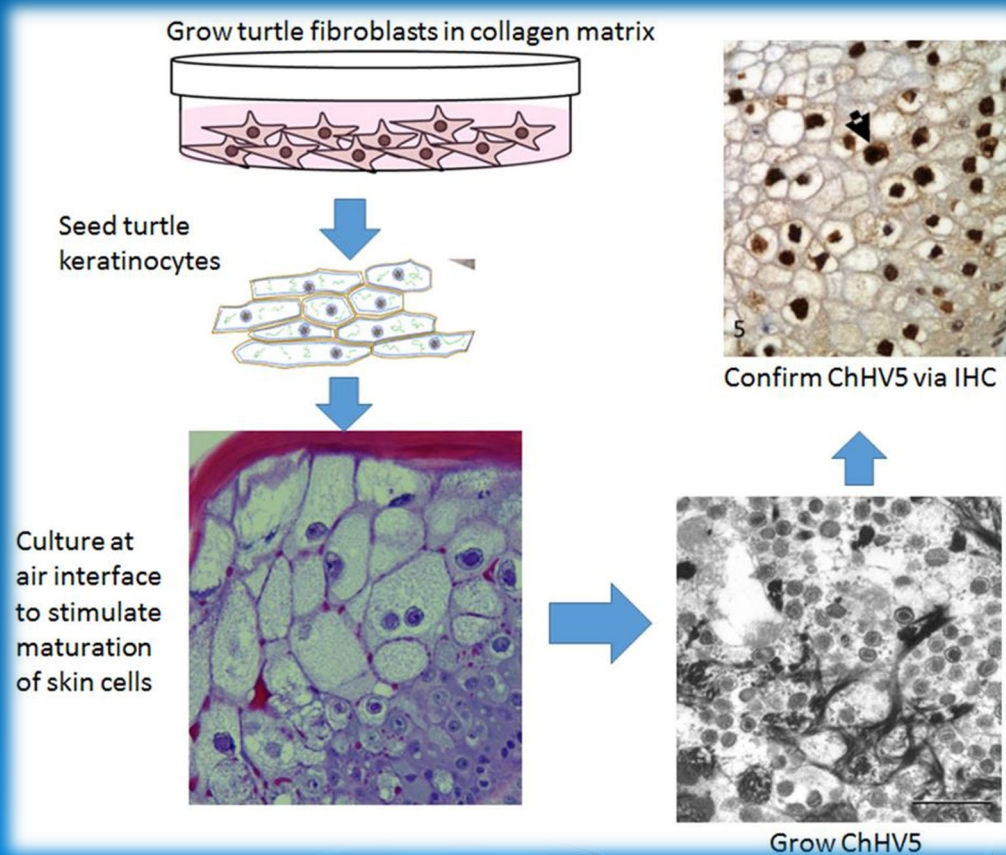


Vet Pathol 52:1195-1220



Insights to FP epidemiology

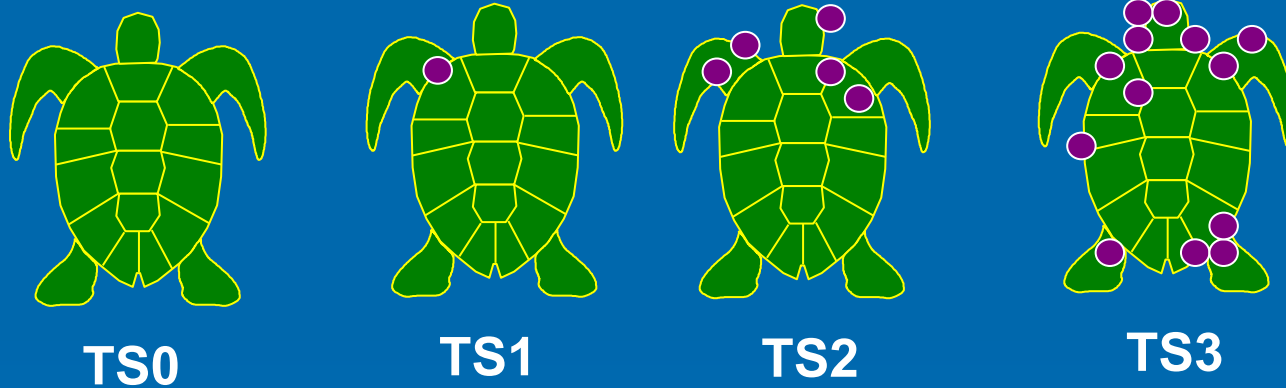
Virus can only be grown in the lab using 3D skin cultures





Insights to FP epidemiology

Development of a tumor scoring system



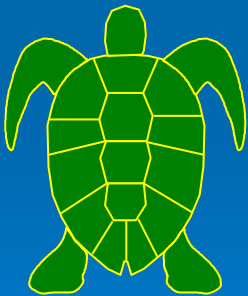
More severe tumor -> Anemia/heterophilia



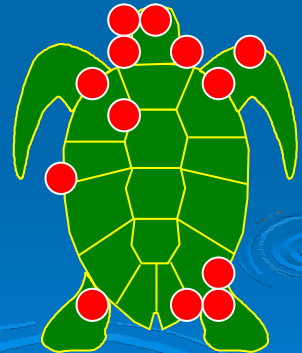
Insights to FP immunology

Vibrio

Immune system



Time



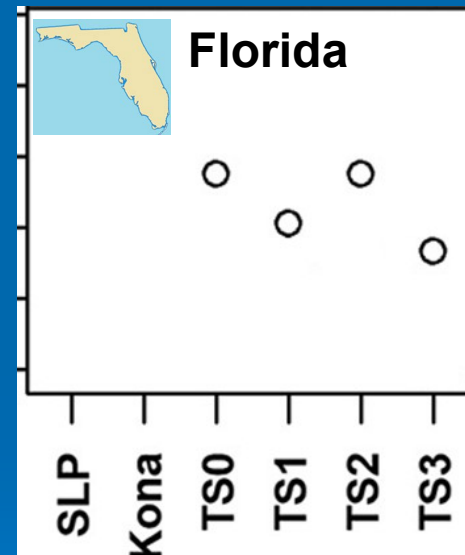
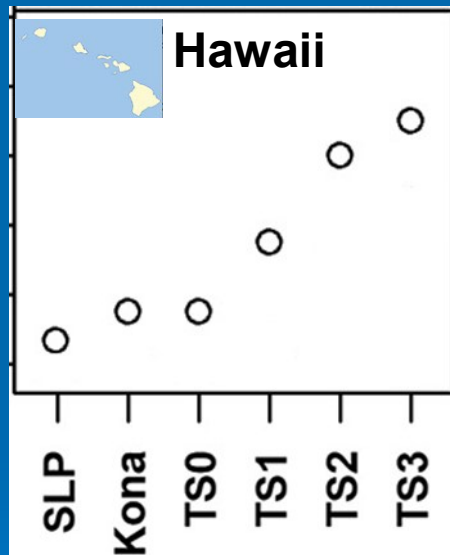
Tumored turtles become immunosuppressed and septic

J Wildl Dis 35:804-807
J Wildl Dis 37:574-581
Dis Aquat Org 53:41-46

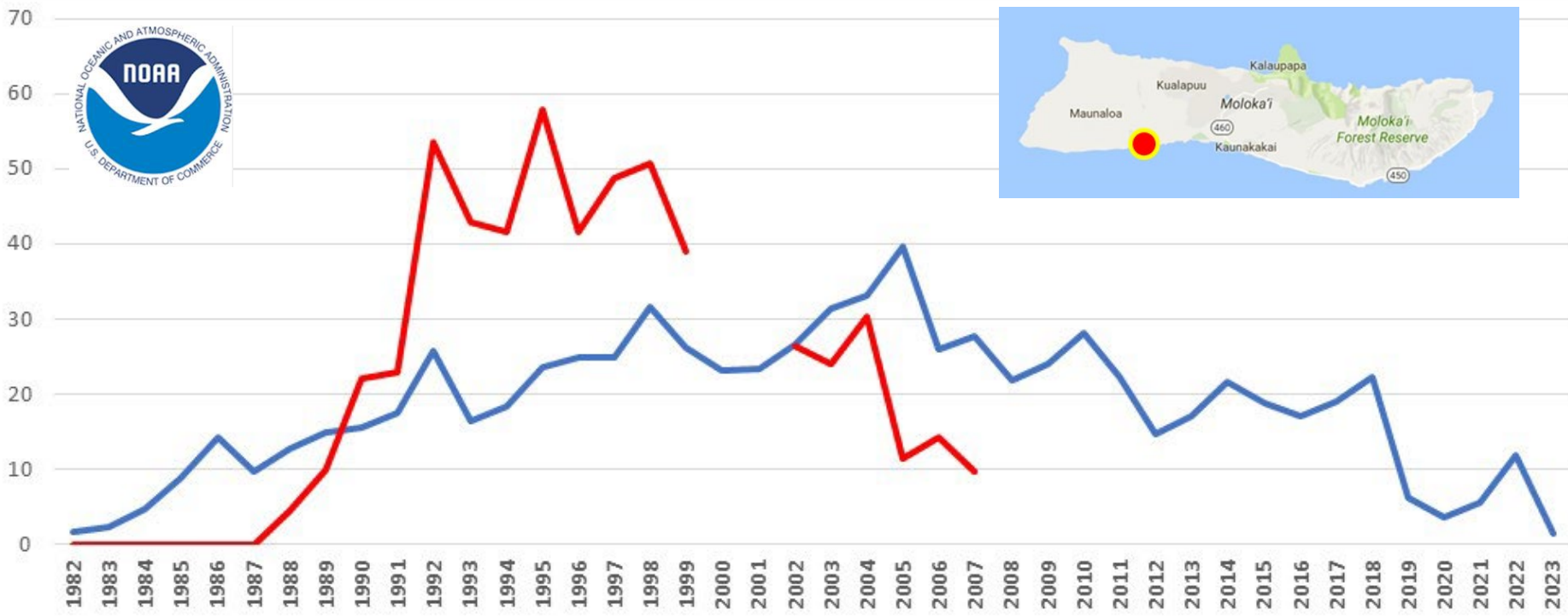


Insights to FP epidemiology

Immune response to ChHV5 tracks tumor score more closely in Pacific than Atlantic greens



FP is declining in Hawaii but coming up in Guam (Northern Marianas)



— Strandings — Molokai



National Wildlife Health Center

Madison, Wisconsin

