

Snake Bites

BEWARE !



Snake Bites

- One of the most feared reptiles on earth
- Yet very little is known about their poisons
- 48,000 People in the U.S. are bitten each year
 - 8000 from poisonous snakes
 - 5-10 die yearly



Worldwide Statistics

- 40 % of people bitten by poisonous snakes
no venom passes
- 85 % of the bites only enough venom passes
to make the victim sick
- Remaining 15 % require acute treatment
- In other-words only **5-10 %** of the people
bitten by poisonous snakes require acute
treatment

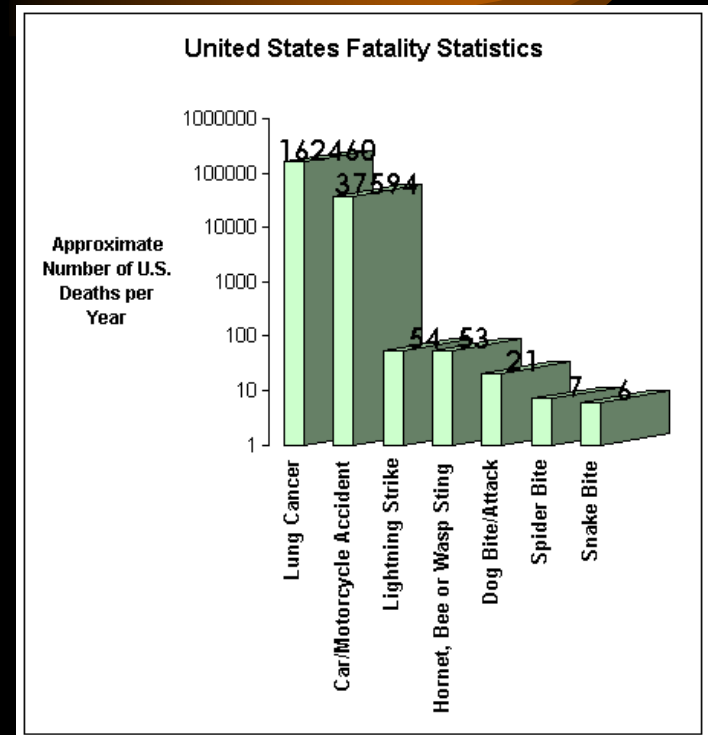
Demographics



- Majority bites on lower and upper extremities
- 96 % of poisonous bites are from pit vipers
- Males 5 x greater incidence than females
- **Less than 1 mile away from home**

Mortality

- Not Instantaneous
- 38 % in the first 12 hours
- 90 % within 48 hours
- Delay in Treatment
 - Most Important Factor



2006

U.S. Statistics



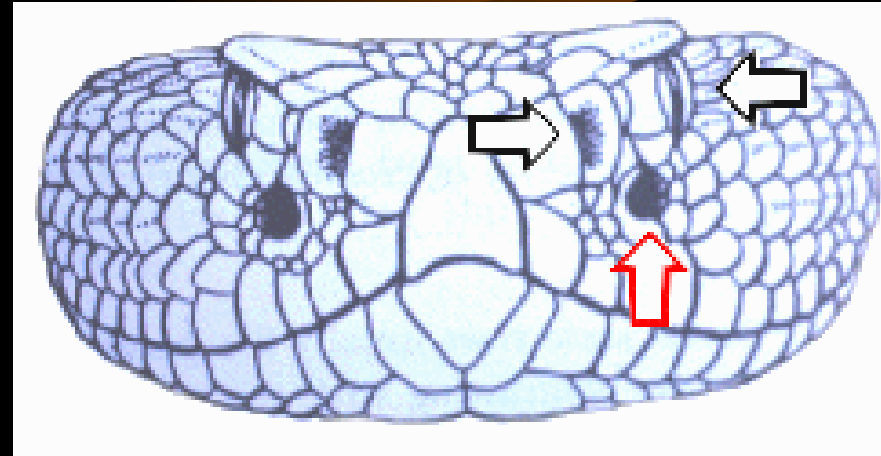
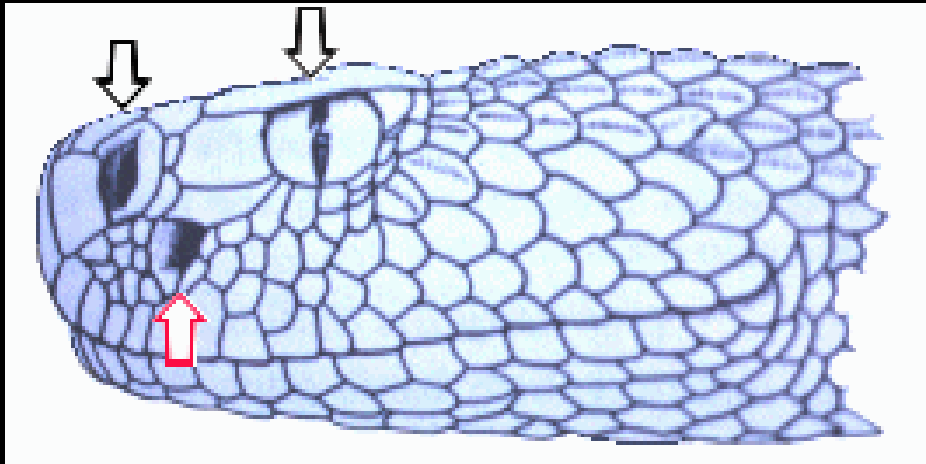
- 120 Species of Snakes
 - 375 are poisonous
 - seek shelter when temp < 55 or > 100 F
- Five Different Classifications
 - **Crotalidae: Pit Vipers**
 - **Elapidae: Coral Snake**
 - Viperidae: Puff Adder
 - Hydrophidae: Seasnake
 - Colubridae: Boomslang

Characteristics

- **Poisonous Snakes**
 - Facial Pits: Temperature Sensors
 - Two Hollow Retractable Fangs
 - Vertically Elliptical Pupils
 - Triangular Head
 - Some have a tail called a rattle



Pitviper Facial Pits



Side and Frontal views of a pitviper's head--showing facial pits (red arrow), eyes and nasal openings.

These images were drawn by Walter Auffenberg (a Stetson University graduate). They were taken from the Florida Museum of Natural History Venomous Snakes of Florida Page (with permission--check the link on the pigmy rattlesnake Homepage.)

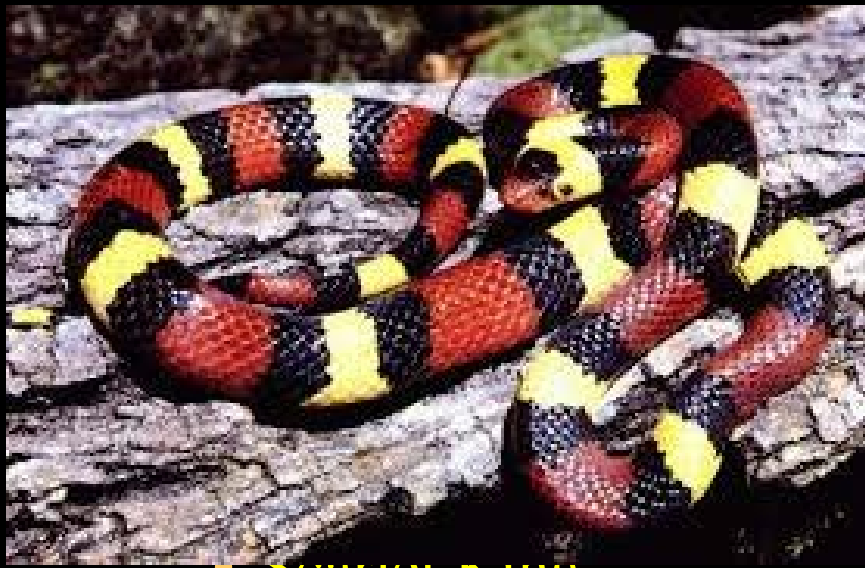
Characteristics

- **Non Poisonous**
 - Lack definite Fangs
 - Small teeth arranged in rows
 - Round Heads
 - Round Pupils
 - Double Row of Ventral Scales



Characteristics

- Coral Snakes
 - fixed and shorter fangs



• Scarlet King



Venom

- **Extremely Complicated Substance**
 - Modified Saliva containing Protein Toxins
- Secreted by large glands in the upper jaw
- Injected via the hollow fangs into the prey



Venom

- **Pit Vipers:**
 - Mainly Hemotoxins
- **Coral Snake:**
 - Mainly Neurotoxins



Venom: Side Effects

- Local
- Systemic
- Cardiovascular
- Hematological



Local Reactions

- **Pit Viper:**
 - Hallmark: Local Necrosis
 - Area of Bite: Worse Tissue Destruction
 - Direct Necrosis Happens Immediately
 - ecchymosis, blebs & blisters
 - Pain
 - Numbness or Weakness at Bite Site

Rattlesnake Bite



Rattlesnake Bite



Local Reactions

- **Coral Snake**
 - Little or No Reaction
 - Pain usually mild



Systemic Reactions



- **Pit Vipers:**
- **Mild:**
 - general weakness, anxiety, nausea
- **Severe:**
 - N/V, tachycardia, tachypnea, paresthesias, coma, and death

Systemic Reactions



- **Coral Snakes:**
- Mild - Moderate:
 - Drowsiness, anxiety, weakness, headache, blurred vision, and generalized seizures
- Severe:
 - Paralysis of the Cranial Nerves (2-3 Hrs)
 - Respiratory Paralysis (4 hrs)

Cardiovascular Effects



- **Pit Vipers:**
 - Sinus tachycardia, PVC's, ST segment elevation
 - pulmonary edema
 - vascular collapse
 - irreversible shock
 - decreased respiratory effort & apnea

Cardiovascular Effects



- **Coral Snake**
 - less effects than pit vipers;
 - depressed myocardial and skeletal muscle
 - respiratory arrest or cardiac collapse
 - ptosis, slurred speech, dilated pupils, or muscle weakness

Hematological Effects



- Pit Vipers:
 - complex coagulopathies
- Coral Snake:
 - rare
- Infection is rare but treat with broad-spectrum antibiotic

Treatment



- Two objectives:
 - Neutralize the Venom
 - Limit and Repair Damaged Tissue

Field Treatment



- 
- Incision & Suction
 - Tourniquet
 - Cooling & Cryotherapy

In-Hospital Treatment

- ABC's
- Vitals, Temp
- IV: NS
- Routine Labs
- Analgesics
- Remove rings and clothing
- Frequent Measurements of the Limb Involved



In-Hospital Treatment

- **Anti-Venom**
 - Always given IV
 - **CroFab.** Formulated from sheep immunized from four snakes native to North America (Western & Eastern Diamondback, Mojave rattlesnake and the Cottonmouth).
 - Dry state: Ten milliliters of sterile water should be used to reconstitute each vial.
 - Infused at a rate of 25-50 milliliters/hour rate for the first ten minutes. If no allergic reaction is noted then infuse the rest of the bag over the next hour. Can infuse up to six vials.
 - Once initial control is maintained then two vials of CroFab should be administered IV every six hours for three doses
 - if patients is allergic to papaya or papain (not recommended),

Test Dose



- Never Give the Test Dose unless you have Supportive Measures at the Bedside.
- Antivenin is much less effective after 12 hours and best within 4 hours of envenomation

Clinical Classifications of Snake Bite

- **Minimal**
 - Confined to the Bite Site
 - No systemic symptoms
- **Moderate**
 - Extend beyond the site but without life threatening symptoms
- **Severe**
 - Swelling, ecchymosis, bullous formation
 - Severe Systemic Symptoms

Venom Dosage (Horse Serum)

- **No Envenomation**
 - None
- **Mild**
 - None
- **Moderate**
 - 4-10 vials
- **Severe**
 - 10-20 vials
 - Enough to halt symptoms
- **Serum Sickness**
 - 7-21 days later Type III Immune Complex Hypersensitivity





- **Hybrid man-eating pythons? Florida is on alert.**
- **Scientists worry that two species of nonnative pythons now near the Everglades could breed, yielding more aggressive offspring.**
- By [Patrik Jonsson](#), Staff writer of The Christian Science Monitor / September 15, 2009

Any



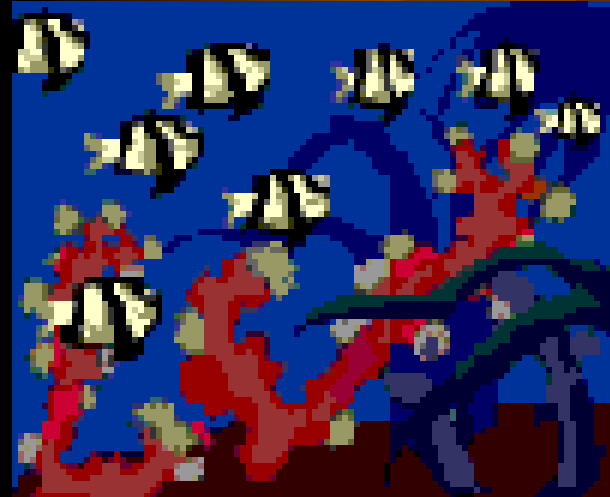
Questions ?

Underwater Encounters



The Ocean

- 71 % Earth = Water
- 80 % of all Living Creatures
- Most Injuries are Gestures of Warnings or Attacks
- Most Wounds are Traumatic Violations of the Skin



Basic Wound Management

- Antibiotic Therapy
 - *Vibrio* (non-cholera)
- Bactrim
- Third Generation Cephalosporins
- Tetracycline
- Fresh Water- *Aeromonas*
 - Bactrim, Augmentin and newer fluoroquinolones (levofloxacin, moxifloxacin, gatifloxacin)



Sharks



- Odds 1/5 million
- 30 - 100 shark attacks per year world wide
- Risks:
 - surfing, late afternoon and early evening
- Varying degree of tissue destruction and blood loss



Florida Statistics



	Attacks	Deaths
2010	14	1
2011	11	0
2012	27	0
2013	23	0

Barracuda

- Attack out of confusion or attracted to a shiny object
- Canine like teeth
 - straight or V shaped lacerations



Sponges

- Two Syndromes
- Plant induced contact dermatitis
 - strong pruritic component
- Treatment:
 - dilute acetic acid
 - steroids (lotion or oral)
- Desquamation



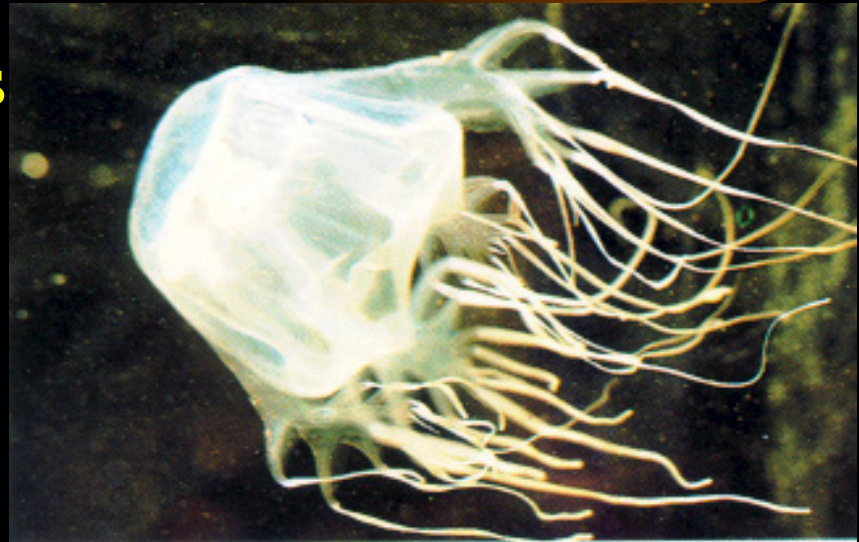
Sponges

- Irritant Dermatitis
 - penetration of Calcium Carbonate or Silicon Dioxide into the skin
- Particles should be removed with adhesive tape and acetic acid applied to the skin

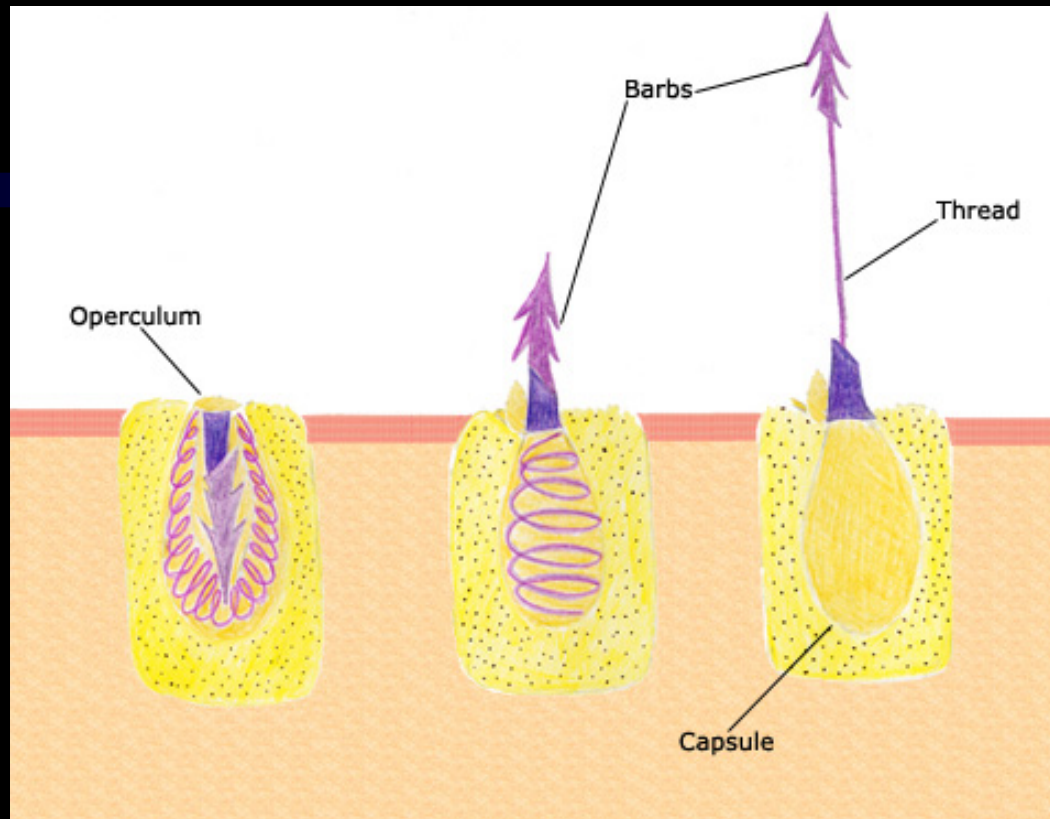


Coelenterates

- Possess venom inducing stinging cells
 - Nematocysts
- Three Large Groups
 - Hydrozoans
 - Scyphozans
 - Anthozans



Nematocysts



The diagram above shows the anatomy of a nematocyst cell and its “firing” sequence, from left to right. On the far left is a nematocyst inside its cellular capsule. The cell’s thread is coiled under pressure and wrapped around a stinging barb. When potential prey makes contact with the tentacles of a polyp, the nematocyst cell is stimulated. This causes a flap of tissue covering the nematocyst—the operculum—to fly open. The middle image shows the open operculum, the rapidly uncoiling thread and the emerging barb. On the far right is the fully extended cell. The barbs at the end of the nematocyst are designed to stick into the polyp’s victim and inject a poisonous liquid. When subdued, the polyp’s tentacles move the prey toward its mouth and the nematocysts recoil back into their capsules.

Portugese Man of War

- Semitropical Atlantic
- NO₂ & CO sail
- tentacles can reach 100 feet
- retain potency for months



Box Jellyfish

- Their venom is considered to be among the most deadly in the world, containing toxins that attack the heart, nervous system, and skin cells.
- It is so extremely painful, that human victims have been known to go into shock and drown or die of heart failure before even reaching shore.
- Survivors can experience considerable pain for weeks and often have significant scarring where the tentacles made contact.



Clinical Course

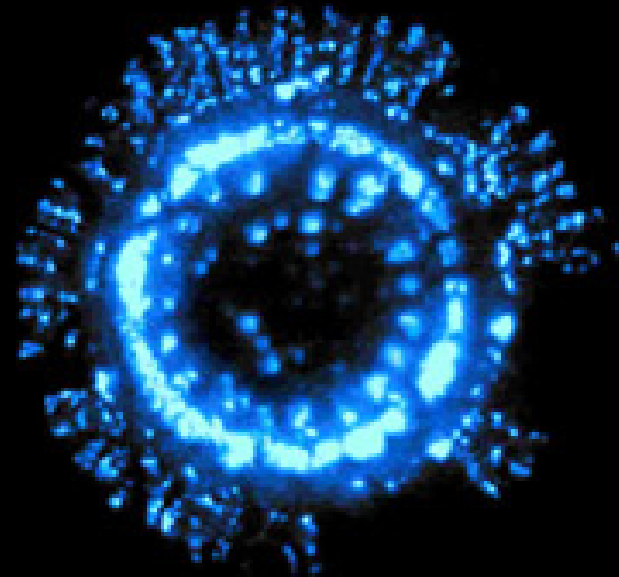
- Range from irritant dermatitis to death
- Mild
 - skin irritation
 - stinging, burning, pruritis, reddish-brown discoloration at contact
- Severe
 - local edema, desquamation, hemorrhage, necrosis





Systemic Pattern

- GI: N&V, abd pain
- MS: myalgias, spasm
- Neuro: HA, vertigo, ataxia, paralysis, seizures, coma
- CV: dysrhythmias
- Resp: bronchospasm, respiratory failure



Treatment

- Supportive therapy
- Calcium gluconate for muscle spasms
- Dermatitis: rinse with sea water. Apply vinegar or 3%-5% acetic acid
- shaving cream
- steroid cream/oral



Sea Urchins

- May have venom
- Spines break off easily
- difficult to remove
- Spines usually absorb within 3 weeks
- Hot water for pain relief



Sting Rays

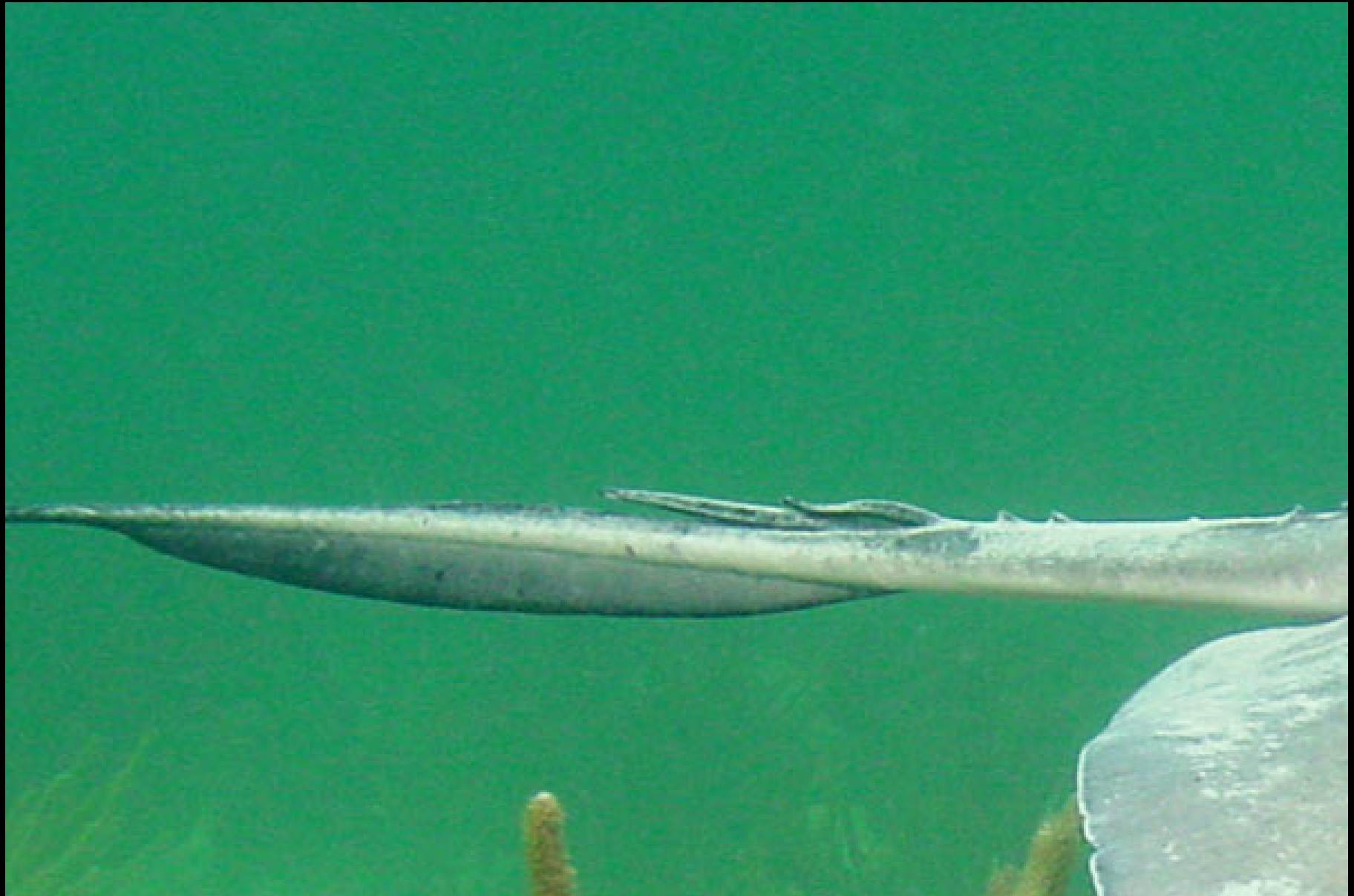
- 1500 injuries a year
- Venom includes multiple toxic fractions
- Wound is traumatic and envenomating
- Immediate Severe local pain, edema and bleeding
- Abd pain, N/V, HA, hypotension, death



Treatment

- Alleviate pain
- Deactivate the Venom
- Prevent Infection
- Life Support
- Wound Care
 - Irrigate with **HOT** water
 - Removed Debris
 - Close the wound with drains, antibiotics







Ciguatera Poisoning

- > 400 species of fish
- Associated >5 toxins
- Unaffected by heat, cold, or taste of the fish
- Onset 15 minutes - 6 hours
- GI, Hot and Cold reversal



Ciguatera Poisoning

- Treatment
 - Supportive
 - IV fluids
 - Refrain from alcohol
 - Anti-histamines - pruritis
 - amitriptyline - dysesthesias
- IV Mannitol



Scromboid Posioning

- occurs when you eat fish meat that wasn't properly refrigerated. A toxin forms when raw fish of the tuna and mackerel family sits in a warm environment. The toxin isn't destroyed by cooking.
- The toxin may give the fish a **peppery or metallic taste**. You should never continue eating a fish that tastes funny.
- About 15 to 30 minutes after eating the fish, symptoms start. These include pounding headache, flushing, rapid palpitations, lightheadedness, and shortness of breath. Some victims may also have vomiting, diarrhea, abdominal pain, hives, or wheezing.
- Treatment : antihistamines

Swimmer's Itch

- **Swimmer's itch** is caused by tiny free swimming organisms called cercariae. The cercariae are able to penetrate the uncovered human skin and cause small red bumps similar to an insect bite.



Seabather's Eruption

- **Seabather's eruption** is caused by larval forms of the thimble jellyfish which are the same size of flakes of black pepper. When these tiny immature jellyfish are trapped inside a bathing suit or stick to hair bearing areas of our body, their stinging capsules inflict minute stings similar to the mature jellyfish



Treatment



- Caladryl
- Cortisone Creams
- Oral Anti-Histamines
- Oatmeal



Questions ????



Bites & Stings



Arachnid Envenomation

- Scorpions



Scorpions

A decorative graphic on the right side of the slide, resembling the tail of a scorpion. It is a horizontal, elongated shape with a gradient from dark purple on the left to bright yellow on the right, tapering to a point on the right.

- Primitive
- Around the world in Temperate Climates
- Two Major Families
 - Buthidae-poisonous
 - Vejovidae-non-poisonous
- In the U.S. the most deadly is **Centruroides sculpturatus**
 - Inhabits Southwestern U.S.
 - Arizona, California, New Mexico & Texas

Scorpions



- Venom is complex
 - Proteins & Polypeptides
 - **Primary Neurotoxic**
- **Grade 1**
 - Grade I envenomations produce local pain and paresthesias at the sting site.
- **Grade 2**
 - produce local symptoms as well as remote pain and paresthesias
- **Grade 3**
 - produce **either** cranial nerve **or** somatic skeletal neuromuscular dysfunction.

Grade 3

- Cranial nerve dysfunction can manifest as blurred vision, abnormal eye movements, slurred speech, tongue fasciculations, and hypersalivation

Treatment



- Treatment:
- Grade I & II
 - Local Compresses and Oral Analgesics
 - Steroids, Anti-histamines, Sympathomimetics: Little Value
- Grade III
 - Respiratory and Cardiovascular Stabilization
 - IV Valium
 - Anti-Venom

Scorpion Envenomation

- http://www.youtube.com/watch?feature=player_detailpage&v=MbuGEQs6aSw

Black Widow



Black Widow

- Life span 2-3 years
- Nest in dimly lit areas
- Males $1/20^{\text{th}}$ the size and poses no threat
- Not aggressive



Black Widow Venom



- Very toxic
- Bite Usually Painless or Small Pinprick
- Venom acts to destabilize nerve cell membranes
- Release of Catecholamines and depletion of acetylcholine at nerve endings
 - Neurotoxic

Symptoms

- 30 minutes post exposure: limb and lymph node pain, may see two tiny red marks
- Cramping pain in the thighs, abdomen, and chest
- Abdomen will become rigid
- Muscle fibrillation, tonic contractions
- N/V, salivation, diaphoresis, restlessness
- HTN, pulmonary edema, right ventricular strain

Treatment

- Stabilization and Attention to secondary end-organ damage
- IV, O₂, monitor
- Cool compresses at the site
- **Muscle Cramps**
 - Valium, methocarbamol, calcium gluconate *
- **Antibiotics not indicated. Tetanus prophylaxis**

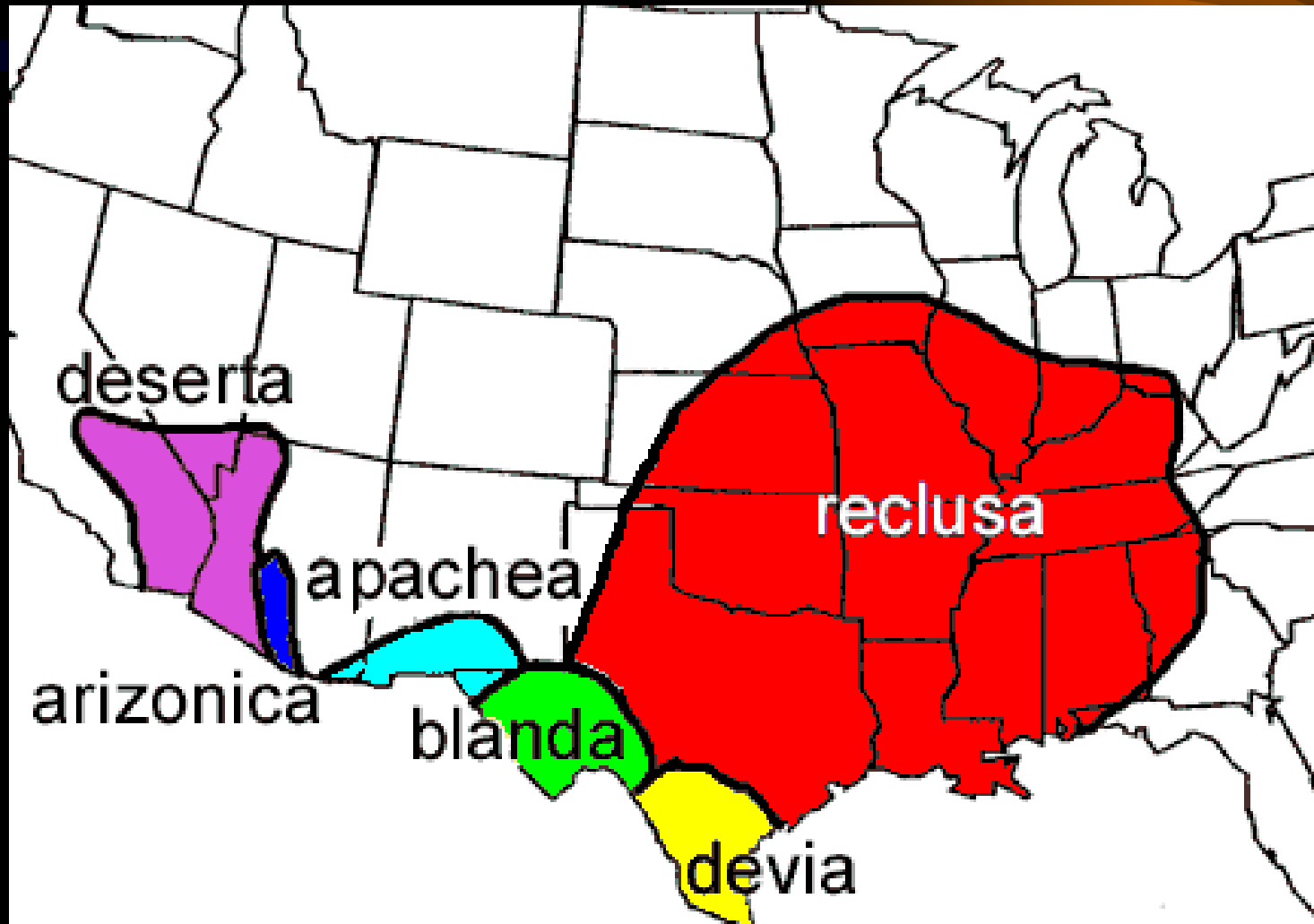
Black Widow Antivenom

- **Indicated for**
 - End-organ damage
 - Hypertension
 - Respiratory Failure
 - Continual Symptoms
 - Pregnancy
 - < 16 & > 65 years old with symptoms
- Given as soon as possible (**1-2 vials**)
- **Resolution in 1 hour**
- **Equine Origin** (Merck, Sharp & Dohme)

Brown Recluse



Southern United States



Brown Recluse



- Very Secretive
- Not aggressive and direct contact is by accident
- Occupy dark, dry spaces
- Brown/tan color violin on the cephalothorax



J. Castner/U. Florida

Brown Recluse Bite



- Little or no sensation
- Contains cytotoxins
- Severe ulcerative necrosis in weeks to come
- Initial lesion
 - Red, edematous
 - Blue/gray macular halo with central puncture
 - Progresses to blebs, purpura and large area of necrosis



Recluse Symptoms

- Fever
- N/V
- Diarrhea, malaise or arthralgias
- Leukocytosis, hemoglobinuria
- DIC, shock
- Death very rare
- **Worse areas: increased subcutaneous tissue**



Recluse Treatment

- Anti-venom being tested
- Supportive therapy
- **Mixed Results**
 - Steroids, anti-histamines, surgical excision, hyperbaric oxygen
 - Surgery should wait until at least 8 weeks
- **Dapsone** (leprosy)

Africanized Honey Bees



Killer Bees are slightly smaller than the European honey bee, but only an expert can tell them apart

Killer Bees

- 1956 Brazilian scientists attempting to breed a honey bee better adapted to South American tropics
- 1957- some escaped
- Began breeding with local honey bees
- Started multiplying and expanding their range northward (200 miles/yr)
- Past decade crossed into North America

United States



- First swarm detected in 1990
 - Hidalgo, Texas
- Arizona and New Mexico – 1993
- California – 1994
 - Within 1 year 8000 sq. miles in San Diego county
- Now in Florida, Utah & Mexico

- **100,000 'killer' bees attack Florida park rangers**
- **A pair of park rangers in Tampa, Fla., were hospitalized after disturbing a hive of what are likely Africanized 'killer' bees, a hybrid species introduced in the Americas in the 1950s.**
- By [Mai Ngọc Châu](#), Contributor / March 7, 2013

Killer Bees

- Venom no more potent than native honey bees
- Attack in far greater numbers
- Pursue for greater distances
- Remain agitated for 24 hours
 - Attack anything up to a $\frac{1}{4}$ mile distance from the hive
- Don't have to disturb the hive to promote an attack

Killer Bees



- What to do ?
 - Avoid contact
 - Target the Head
 - Run for shelter
- Treat supportively
- Treat appropriately for any allergic reaction

Puss Caterpillar
(*tree asp*)



Puss Caterpillar

- Come in silky gray to reddish brown colors
 - All have sweeping hairs over there entire body
- Turn into flannel moths
- Some of these hollow hairs have poison glands at their base
- These spines become embedded in skin after handling



Puss Caterpillar

- Very painful at contact site
- Most common symptoms are redness, swelling, localized pain, itching and rash
- Spines can be removed by applying Scotch[®] tape
- Anti-histamines and over the counter pain pills are usually not effective
- Prevention is the key



Puss Caterpillar Sting



Questions

