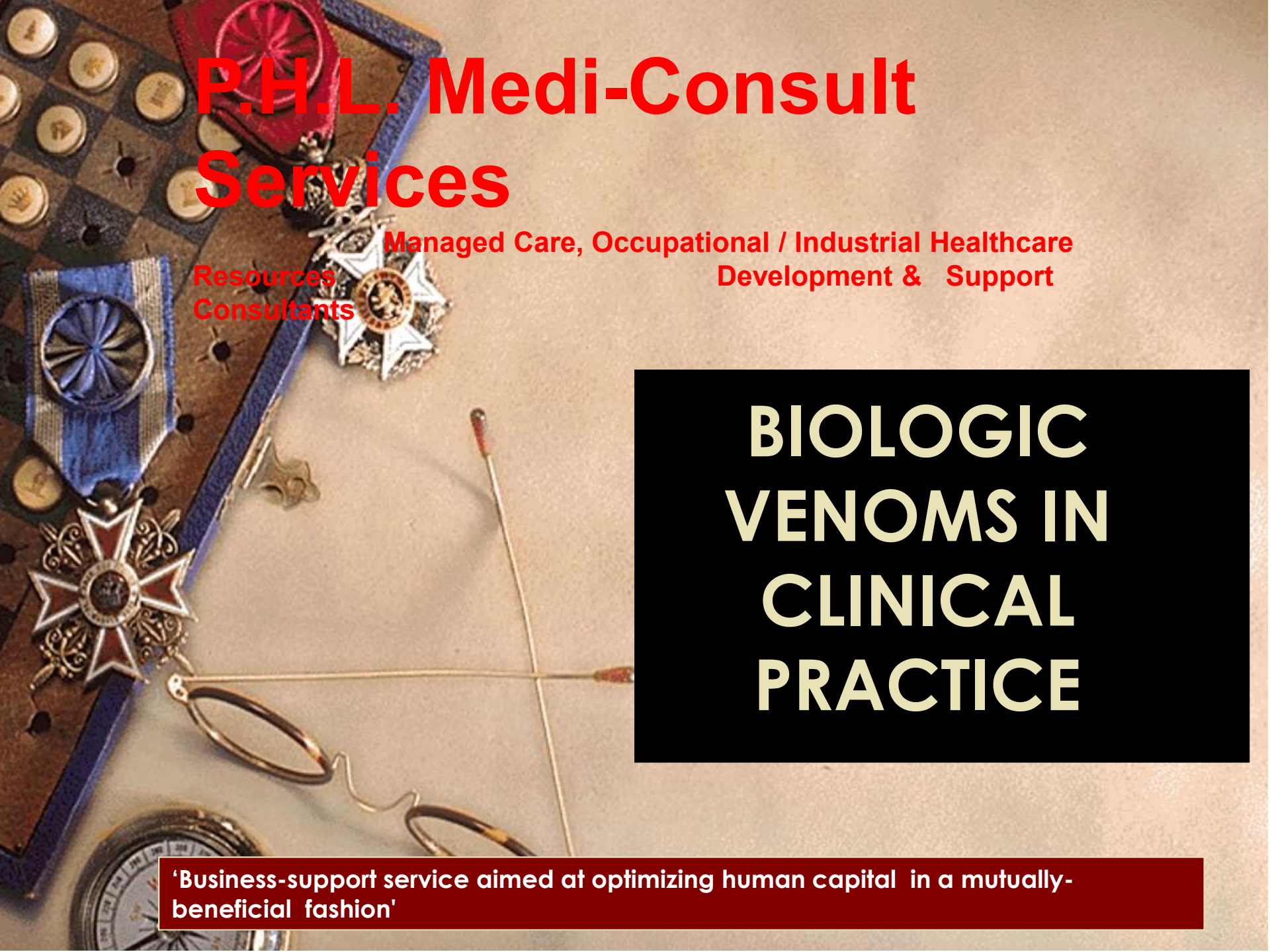
P.H.L.Medi-Consult Services

Managed Care, Occupational / Industrial Healthcare Resources Development & Support Consultants

DR. A .A. AKINTOLA

'Business-support service aimed at optimizing human capital in a mutually-beneficial fashion'



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BIOLOGIC VENOMS IN CLINICAL PRACTICE

'Business-support service aimed at optimizing human capital in a mutually-beneficial fashion'

Goal and Objective

- I. Raise awareness over Venoms generated by other members of our eco-system
- II. Diagnosis & Management of Toxic SHOCK

DEFINITION

Venom is any of a variety of toxins used by certain types of animals. Venom and toxins derived from fishes, amphibians and reptiles have always held an intense interest to biologists. Venoms,also called zootoxins, are liquid brew of toxic chemicals that many animals--including reptiles, fish, and even bugs--use to ward off predators and seize prey.

Introduction

- LIFE THREATINING REACTION
- TYPICALLY CHARACTERISED BY CARDIO-VASCULAR COLLAPSE, RESPIRATORY EMBARRASMENT AS WELL AS CUTANEOUS,GIT MANIFESTATIONS
- RESULTS FROM EXPOSURE TO OFFENDING AGENTS---- FOOD,INSECT STING,LETHAL MEDICATION DOSAGE, PHYSICAL FACTORS
- **between 20,000 and 125,000** CALAMITOUS GLOBAL DEATHS ANNUALLY
- MAY BE CONFUSED WITH OTHER FORMS OF SHOCK &/OR SUDDEN DEATH FROM ASTHMA, AIRWAY FOREIGN BODY,PANIC ATTACK, ETC
- PROMPT INTERVENTION IS CRITICAL

•Insulin
•Progesterone

•Antithymocyte globulin
•Intravenous immunoglobulins
• Total Dose Inferon

•Streptokinase

•Milk
•Egg
•Wheat
•Soy
•Peanut
•Tree nuts
•Shellfish

•Hymenoptera
•Fire Ant
•Snake

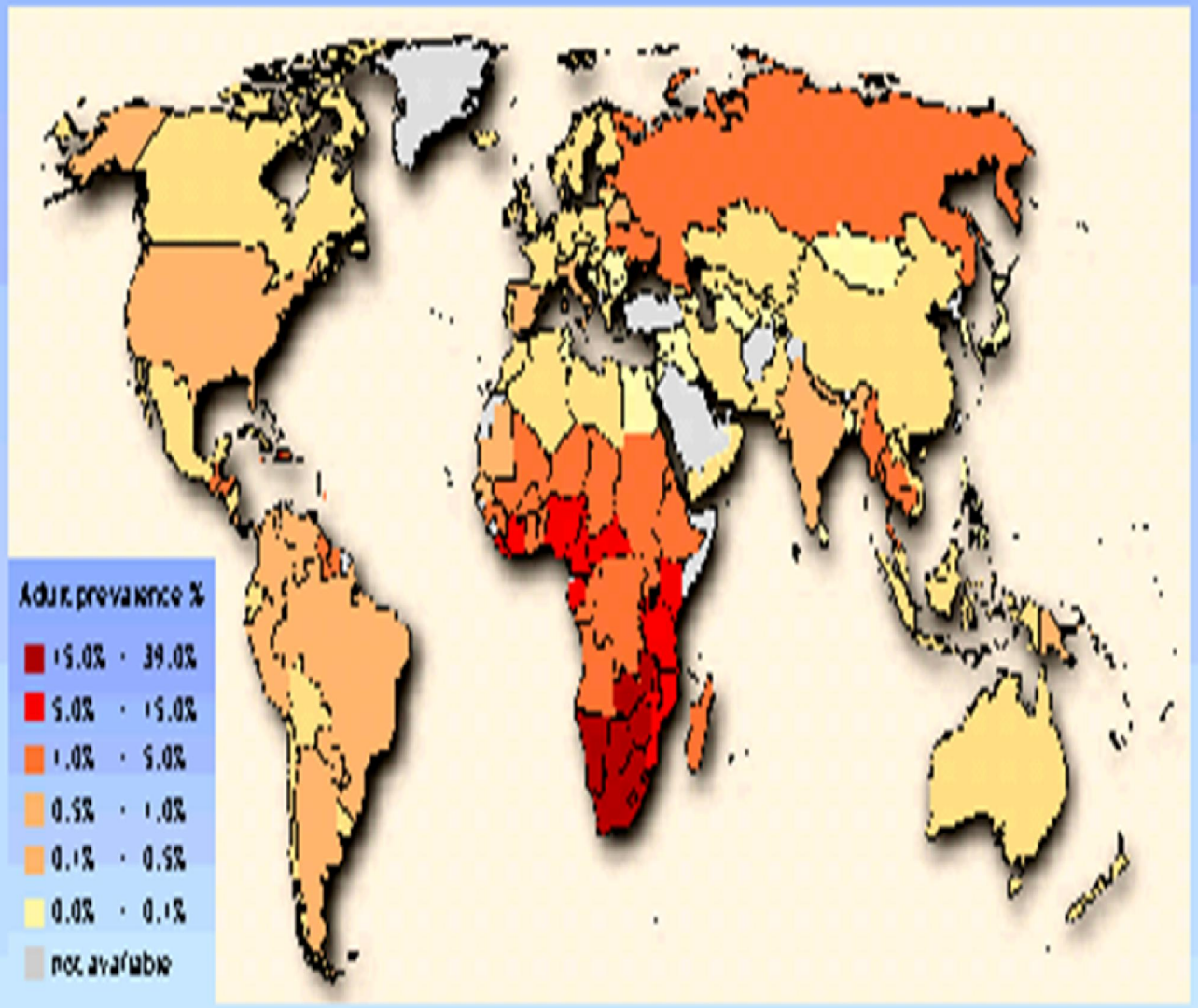
•Latex
•Radio-contrast media
•Dialysis membranes
•Therapeutic allergen extracts
•Protamine
•Human seminal fluid

aphylaxis

- ***A Jan 2010 Lancet*** **publication discussed how educating communities on how to avoid envenomisation (snake) through bites, or providing them with protective wear, might reduce the risk. Yet when a bite occurs, the correct antivenom and the right training about how to use it, can be lifesaving. Antivenom technologies and their use need to be improved, since organised training programmes are virtually non-existent.**

Venomous snakes are widely distributed in almost every country between latitudes 50°N & 50°S in the western hemisphere as well as 65°N (Scandinavia) &50°S in the eastern hemisphere. On land, venomous snakes have been found from sea level up to altitudes higher than 4000 m in the Americas and Himalayas

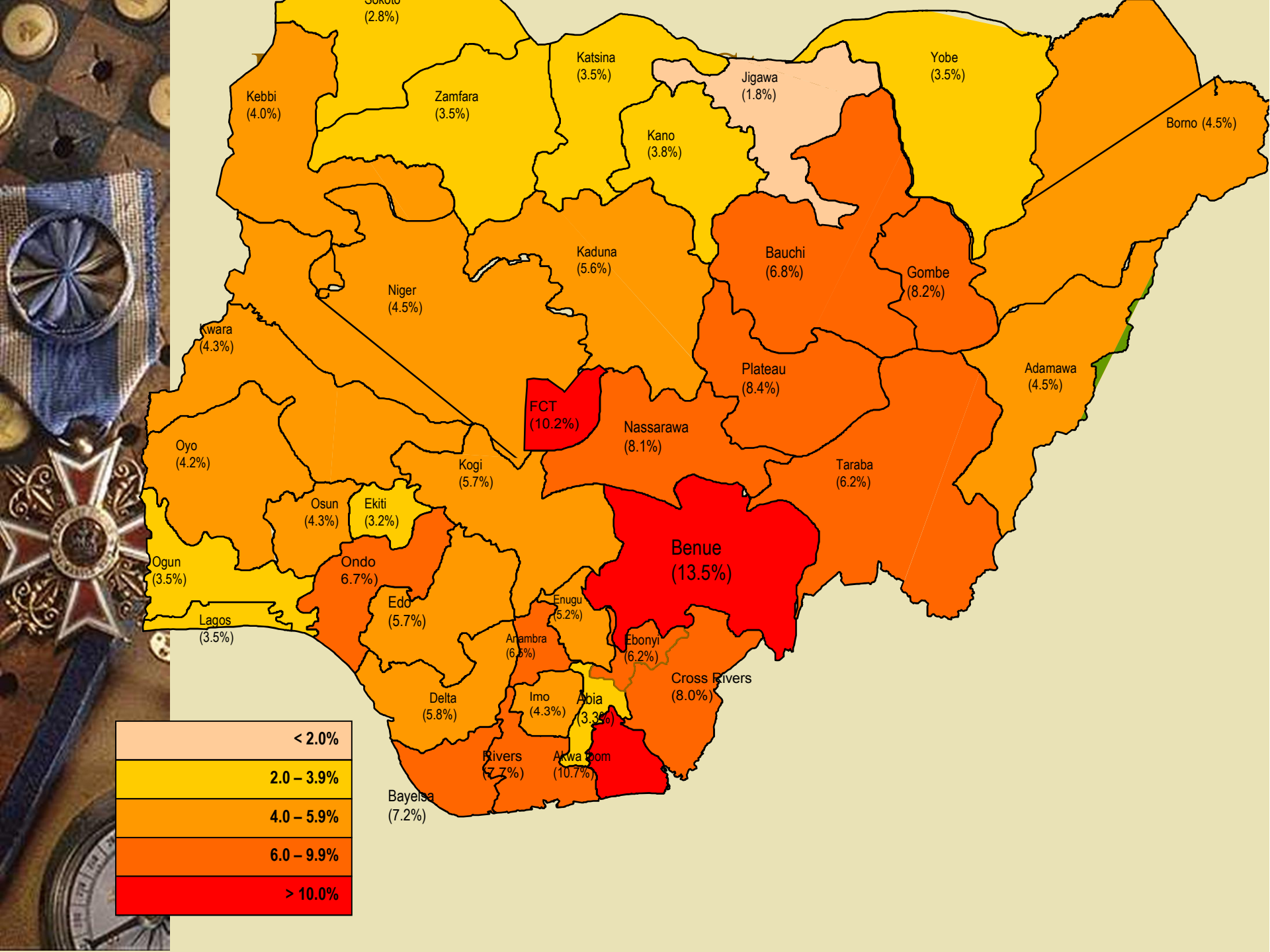
- Sea snakes are found in the Indian Ocean and Pacific Ocean between latitudes 30°N and 30°S.
- Seasnakes reach 4,000 feet below sea level



UNAIDS

Source: UNAIDS/WHO, 2001

World Health Organization


Sokoto (2.8%)
Kebbi (4.0%)
Zamfara (3.5%)
Katsina (3.5%)
Jigawa (1.8%)
Yobe (3.5%)
Kano (3.8%)
Borno (4.5%)
Kaduna (5.6%)
Bauchi (6.8%)
Gombe (8.2%)
Niger (4.5%)
Kwara (4.3%)
Plateau (8.4%)
Adamawa (4.5%)
FCT (10.2%)
Nassarawa (8.1%)
Oyo (4.2%)
Kogi (5.7%)
Taraba (6.2%)
Osun (4.3%)
Ekiti (3.2%)
Benue (13.5%)
Ogun (3.5%)
Ondo 6.7%)
Edo (5.7%)
Enugu (5.2%)
Lagos (3.5%)
Anambra (6.5%)
Ebonyi (6.2%)
Cross Rivers (8.0%)
Delta (5.8%)
Imo (4.3%)
Abia (3.3%)
Rivers (7.7%)
Akwa Ibom (10.7%)
Bayelsa (7.2%)
< 2.0%
2.0 – 3.9%
4.0 – 5.9%
6.0 – 9.9%
> 10.0%

Around 5.5 million people are bitten by snakes each year, resulting in some 400,000 amputations

Less potent venoms present with ANAPHYLAXIS & ANAPHYLACTOID REACTIONS without Cardiovascular or neurotoxic collapse

- Anaphylaxis is a systemic, immediate hypersensiti - vity reaction caused by Ig E dependent activation of effector cells of the immune system . Predominantly mast cells & basophils.
- Mediators elaborated by these cells are responsible for symptoms

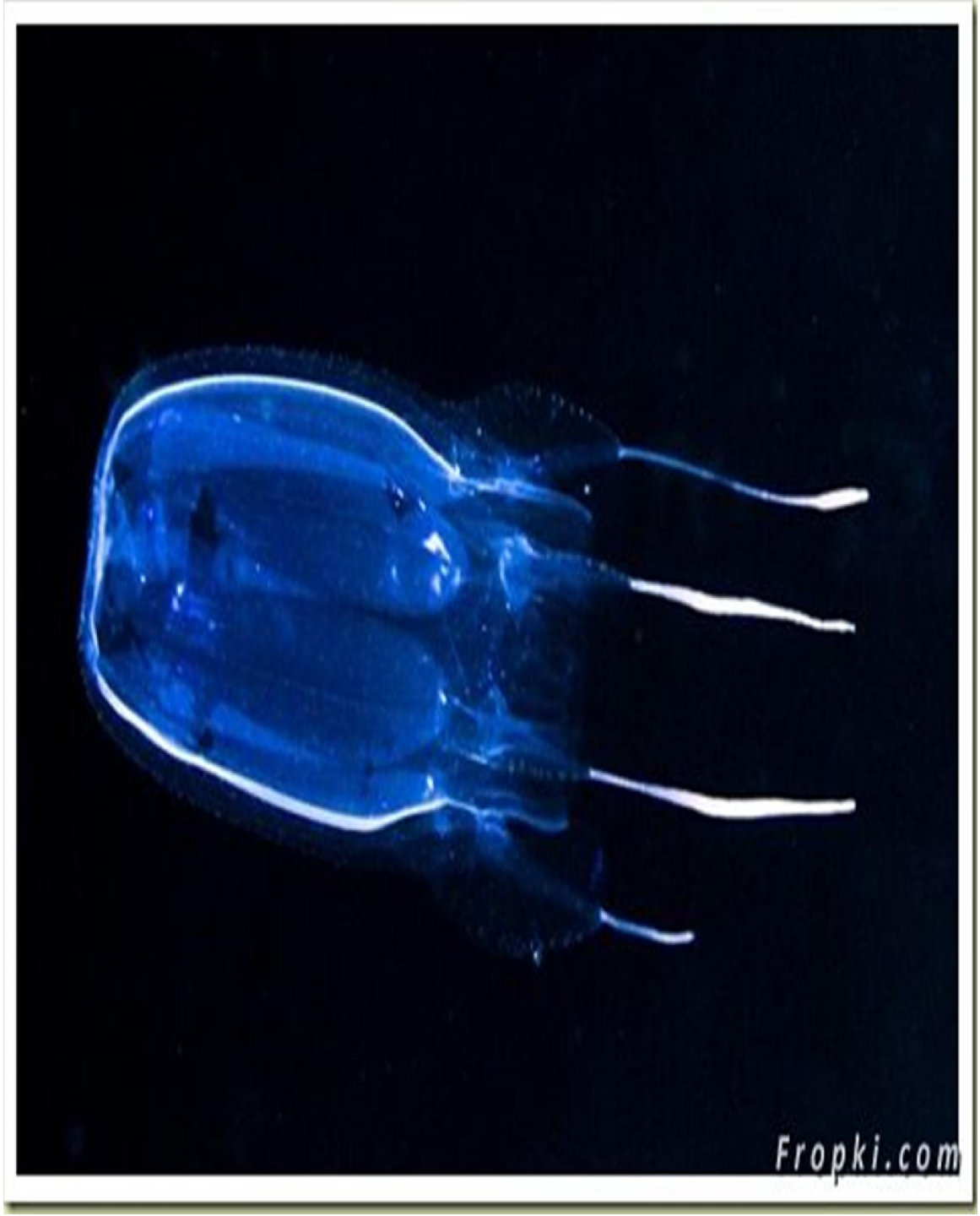
- Poisonous snakes produce venom in a gland in the roof of the mouth; they inject it into prey through hollow teeth called fangs.
- Overwhelming mast cell or basophil activation with IgE mediated bio-chemical is a feature of angio-neurotic oedema initiated by these toxins.
- Envenomation also entails EPP generated at NMJ being prevented by the venom to effect locomotion.

General Mode of Envenomisation

- Acetylcholine receptors, potassium channels, calcium channels--these are different receptors on the surface of the nerve or muscle cells that have a very basic role in maintaining and propagating action potential and muscle contraction. And because one of the primary functions of animal venoms is to immobilize the prey or the predator, toxins are targeted against those molecules that play a very basic role in the locomotion of the prey animal

01-VENOMOUS BOX-JELLY FISH

Jelly box can be found in the waters around Asia and Australia.



02-VENOMOUS KING-COBRA

The King Cobra (Ophiophagus hannah) is the worlds longest venomous snake - growing up to 5.6 m (18.5 ft) in length. Ophiophagus, literally means snake-eater as it eats other snakes.

KING COBRA(2)

- One single bite of this deadly snake can easily kill a human. This snake is even capable of killing a full-grown Asian Elephant within 3 hours if the larger animal is bitten in a vulnerable area such as the trunk.

  Its venom is not as toxic as other venomous snakes, but King Cobra is capable of injecting 5 times more venom than Black Mamba

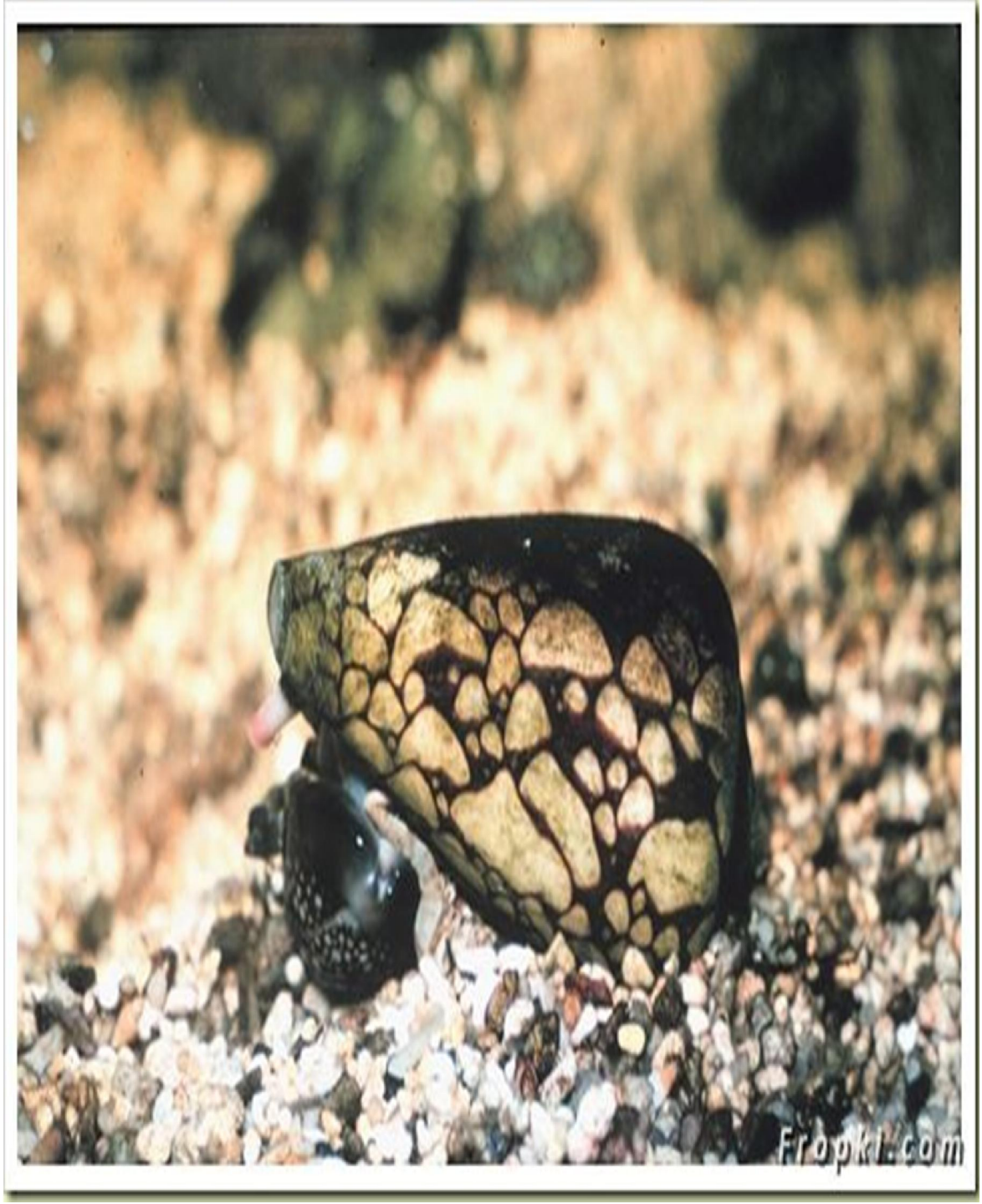
KING COBRA(3)

- resultant mortality up to 5 times faster than that of the black mamba. It is quite widespread, ranging across South and South-east Asia, living in dense highland forests.

03-MARBLED CONED-SNAIL

Little beautiful-looking Marbled Cone snails are often found in warm salt water environment!

If you see it, don’t even think of picking it up. Of course, the true purpose of its venom is to catch its prey. Venom so deadly as any other animal on this list.



MARBLED CONE-SNAIL(2)

- One drop of its venom is so powerful that it can kill more than 20 humans.
- Symptoms of a cone snail sting can start immediately or can be delayed in onset for days. It results in intense pain, swelling, numbness and tingling. Severe cases involve muscle paralysis, vision changes and breathing failure.

MARBLED CONE-SNAIL(3)

- There is no antivenom. However, only about 30 human deaths have been recorded from cone- snail envenomation.

04-BLUE-RINGED OCTOPUS

The Blue-Ringed Octopus is very small, only the size of a golf ball, but its venom is so powerful that can kill a human. Actually it carries enough poison to kill 26 adult humans within minutes, and there is no antidote. Currently recognized as one of the worlds most venomous animals.

04-BLUE-RINGED OCTOPUS(2)

- They can be found in tide pools in the Pacific Ocean, from Japan to Australia
- Its painless bite may seem harmless, but the deadly neurotoxins begin working immediately resulting in muscular weakness, numbness, followed by a breathing cessation and ultimately death.

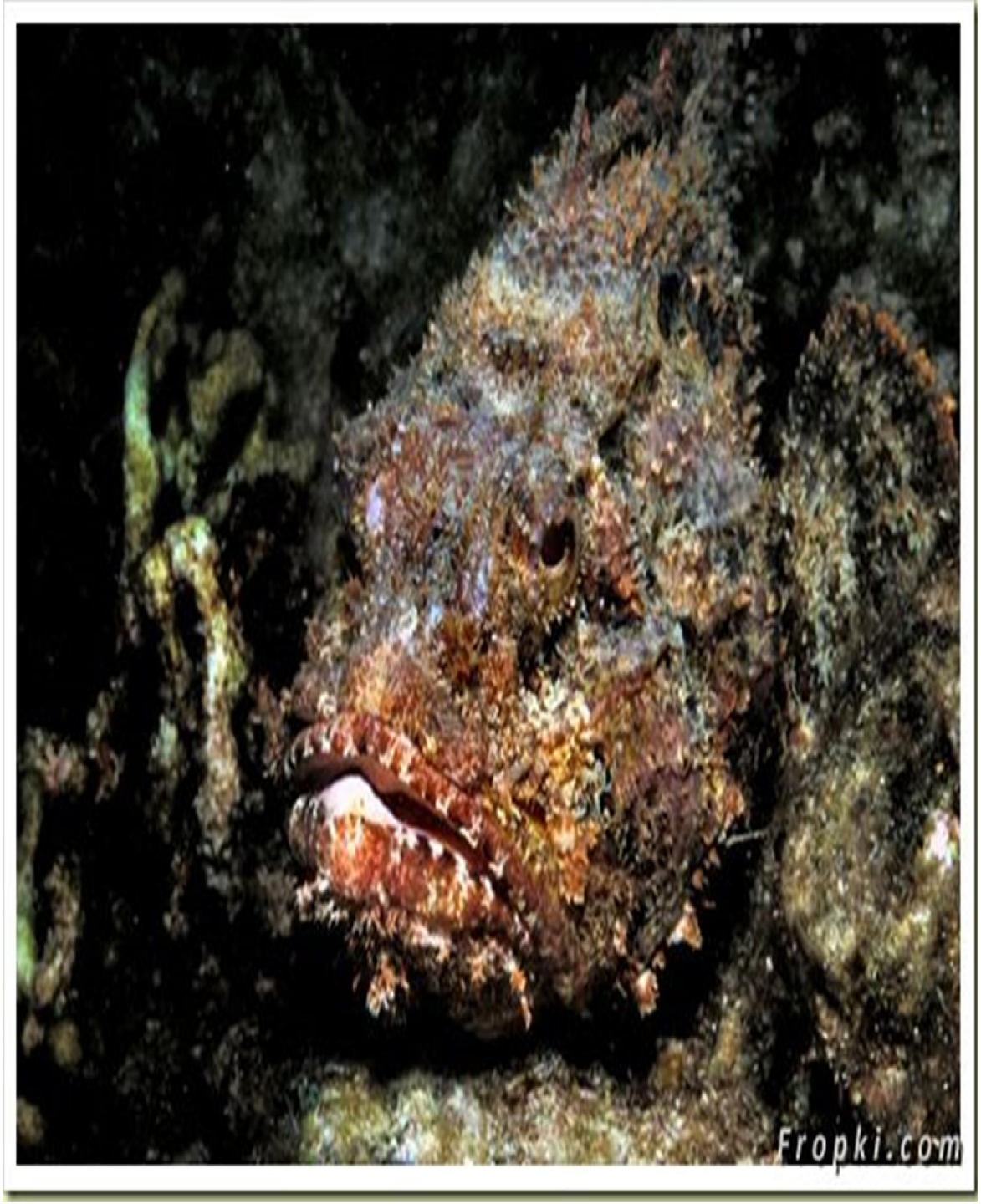
05-DEATH-STALKER SCORPION

Death stalker scorpions are spread in North Africa and Middle East.

Fortunately, while a sting from this scorpion is extremely painful, it would be unlikely to kill a healthy, adult human. Young children, the old, or infirm (with a heart condition) are at the biggest risk.

06-VENOMOUS STONE-FISH

Maybe Stonefish would never win a beauty contest, but it would definitely win the top prize for being The World Most Venomous Fish. Its venom causes such a severe pain that the victims of its sting want the affected limb to be amputated. It is described as the worst pain known to man.



06-VENOMOUS STONE-FISH(2)

- Stonefish stores its toxins in gruesome-looking spines that are designed to hurt would-be predators.
- Stonefish mostly live above the tropic of Capricorn, often found in the shallow tropical marine waters of the Pacific and Indian oceans, ranging from the Red Sea to the Queensland Great Barrier Reef.

06-VENOMOUS STONE-FISH(3)

- It is described as the worst pain known to man. It is accompanied with possible shock, paralysis, and tissue death. If not given medical attention within a couple of hours It can be fatal to humans.

07-WANDERING BANANA-SPIDER

The Brazilian Wandering banana Spider (Phoneutria) appears in the GUINNESS Book of World Records 2007 as the most venomous spider responsible for most human deaths from sting. This spider is believed to have the most potent neurotoxic venom of any living spider.

07-WANDERING BANANA-SPIDER(2)

- Only 0.006mg (0.00000021oz) is sufficient to kill a mouse. They are also so dangerous because of their wandering nature. They often hide during daytime in highly populated areas inside houses, clothes, boots, and cars.
  Its venomous bite causes not only intense pain, the venom of the spider can also cause priapism - uncomfortable erections lasting for many hours that lead to impotence.

08-AUSTRALIAN INLAND (TAIPAN) SNAKE

The Worlds Most Venomous Snake! Its extremely neurotoxic venom is at least 200 - 400 times more toxic than a common cobra. The Inland Taipans venom can kill an adult human in as little as 45 minutes.

Just a single bite from this snake contains enough venom to kill 100 human adults or an army of 250,000 mice. Fortunately this snake is very shy and there have been no documented human fatalities (all known bites were treated with antivenom).

09-VENOMOUS DART-FROG

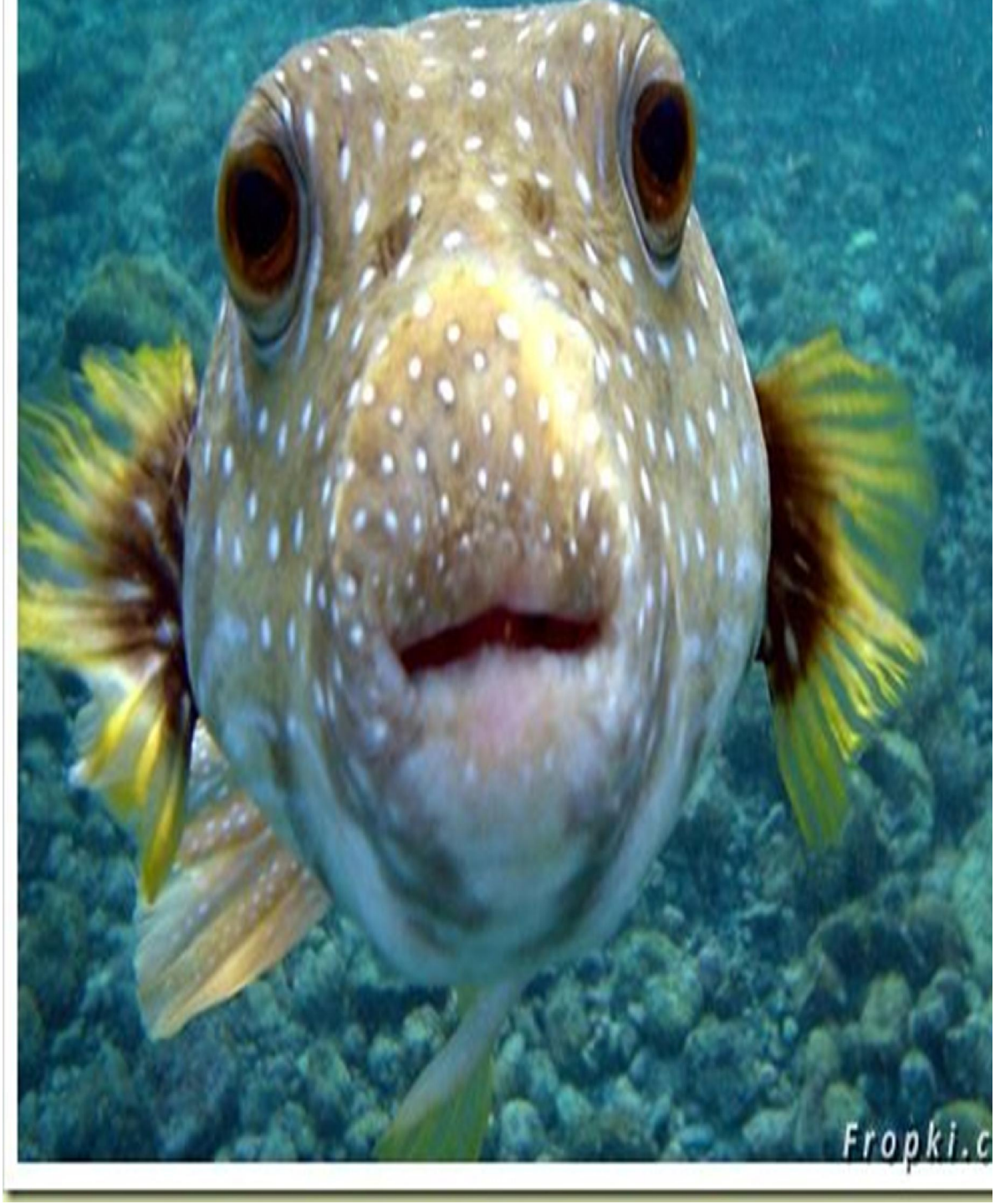
This 2 inch long (5cm) golden poison frog is probably the most poisonous animal on earth. The beautiful and colorful frog exist ordinarily in the rain forests of Central or South America. The venom could kill 10 adult humans or 20,000 mice. Only 2 micrograms of this lethal toxin (the amount that fits on the head of a pin) is capable of killing a human or other large mammal.

09-VENOMOUS DART-FROG(2)

- They are called dart frogs because indigenous Amerindians use of their toxic secretions to poison the tips of their blow-darts.. Poison dart frogs keep their poison in their skins and will sicken or kill anybody who touches or eats it

010-VENOMOUS PUFFER FISH

Puffer Fish are the 2nd most poisonous verte-brate on earth (the 1st one is golden dart Frog).The meat of some species is a deli - cacy in both JAPAN (as fugu) and KOREA (as bok-uh) but the probl-em is that the skin& certain organs of many puffer fish are very poisonous to humans



010-VENOMOUS PUFFER FISH(2)

- There is no known antidote, Most deaths from fugu happen when untrained people catch and prepare the fish. This puffy fish produces rapid and violent death.
- .Puffers poisoning causes deadening of the tongue and lips, dizziness, vomiting, rapid heart rate, difficulty breathing, and muscle paralysis. Victims die from suffocation as diaphragm muscles are paralyzed. Most of the victims die after four to 24 hours.

010-VENOMOUS PUFFER FISH(3)

- Statistics show that there were 20 to 44 incidents of fugu poisoning per year between 1996 and 2006 in all of Japan and up to six incidents per year led to death. Since Fugus poison can cause near instantaneous death, only licensed chefs are allowed to prepare it.

APPLIED IMPORTANCE:

- the different methods of collecting (scorpion) venom, which is known to be a rich source of neurotoxic proteins and peptides(melittin) that specifically target different ion channels.
- Industry now engages bio-technology in the analysis of the specific immunono-therapy with a variety of these substances

Antivenins effective against only one given species are classified as "Monovalent" whereby antivenins effective against a broad range of species are classified as "Polyvalent". For instance, there is not a specific Antivenom developed for an **Australian Copperhead** bite strike. So emergency medical providers are advised to use either Tiger Snake Antivenom or a polyvalent one. The first snake Antivenom was discovered in 1895 by Albert Calmette against the deadly Indian Naja Snake, better known as the **Cobra**. Since that time and through the beginning of the 19th century antivenins were also formulated for many venomous arachnids **(spiders), scorpions** and the Amphibia class of animals which includes **poisonous frogs and toads**.

Antivenoms for therapeutic use are often preserved as freeze-dried ampoules, but some are available only in liquid form and must be kept refrigerated. (They are not immediately inactivated by heat, so a minor gap in the cold chain is not disastrous.)

The majority of antivenoms (including all snake antivenoms) are administered **intravenously**; however, stonefish and redback spider antivenoms are given intramuscularly. The intramuscular route has been questioned in some situations as not uniformly effective.

Some individuals may react to the antivenom with an immediate hypersensitivity reaction (anaphylaxis) or a delayed hypersensitivity (serum sickness) reaction and antivenom should, therefore, be used with caution. Despite this caution, antivenom is typically the sole effective treatment for a life-threatening condition, and once the precautions for managing these reactions are in place, an anaphylactoid reaction is not grounds to refuse to give antivenom if otherwise indicated.

- Although the sight of a large hairy spider is enough to give some people a heart attack, spider venom may eventually be used to treat some heart conditions. In the 4 January issue of *Nature*, Bode *et al.* (*Nature*, **409**, 35–36) report that a peptide isolated from the venom of the spider *Grammostola spatulata* (picture) inhibits atrial fibrillation.

Scorpions

ANTIVENOM	SPECIES	COUNTRY
Alacramyn	*Centruroides limpidus*, *C. noxius*, *C. suffusus*	Mexico
Suero Antialacran	*Centruroides limpidus*, *C. noxius*, *C. suffusus*	Mexico
Tunisian polyvalent antivenom	All Iranian scorpions	Tunisia
Anti-Scorpion Venom Serum I.P.(AScVS)	Indian red scorpion	India
Anti-scorpionique	*Androctonus spp.*, *Buthus spp.*	Algeria
Scorpion antivenom	Black scorpion, *Buthus occitanus*	Morocco
Soro antiescorpionico	*Tityus spp.*	Brazil
SAIMR scorpion antivenom	*Parabuthus spp.*	South Africa
Purified polyvalent Anti-Scorpion Serum(equine)	*Leiurus* spp.& *Androctons* scorpions	Egypt

THANK YOU !!!

- “Poison is in everything, and no thing is without poison”

  - Paracelsius