

Something's Fishy

Acute Poisoning after Consumption of Catfish Soup

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■ Background

- Monday, local health department called TDH (DSHS) regarding a cluster of illness
- Six people involved with 4 hospitalized
 - Two in the ICU
 - Two in the CCU
 - Two observed in the ED and released
- Illness onset was rapid after eating homemade fish soup

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■ Background

- Sunday brunch in December
- Grandparents, their children and grandchildren
- Homemade catfish soup
- Family members became violently after eating the soup (5-15 minutes)
- There were 7 other people arrived late; they were supposed to eat the soup but when they arrived others already were sick

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■ Background

– Reported Symptoms

- Nausea
- Vomiting
- Watery diarrhea
- Stomach cramps
- Diaphoresis
- Dysarthria
- Muscle cramps
- Involuntary movements
- Circumoral paresthesia
- Blurred vision

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■ Background

– Additional findings at hospital

- Pinpoint pupils
- Excessive salivation
- Bradycardia
- hypokalemia
- Negative standard Tox screens

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■ Background

– Dose Response

- Only the soup eaters became ill
- The 2 who only ate a couple of teaspoons became ill but were released from the ER
- The 3 who ate bowl(s) and were admitted to ICU
- One individual ate corn on the cob cooked with the soup and was admitted to the ICU
- Those who ate the most soup became most ill

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■ Differential diagnosis

- **Scombroid poisoning not likely**
 - Fish not in the Scombridae family
 - No reports of severe headache
 - No reports of flushing of face or upper body
 - No reports of itching
- **Ciguatera poisoning not likely**
 - Fresh water fish
 - Onset too rapid
 - No reports of pain in teeth
 - No reports of metallic taste

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■ Differential diagnosis

– Signs and Symptoms

- Miosis
- Salivation
- Sweating
- Diarrhea
- Bradycardia
- Emesis
- Gastrointestinal cramps
- Muscle fasciculations

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■ Differential diagnosis

- Miosis
- Rhinitis
- Salivation
- Sweating
- Lacrimation
- Urination
- Defecation
- Gastrointestinal distress
- Emesis
- Bradycardia
- Lethargy

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- **Differential diagnosis**

- Cholinesterase inhibiting pesticides

- **M R S . S L U D G E**

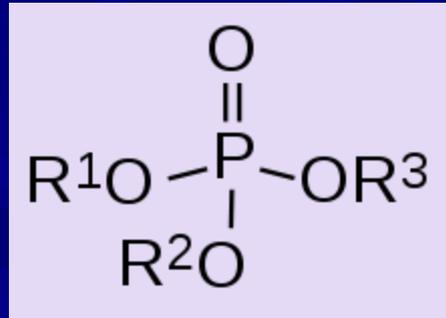
- **D U M B E L L S**

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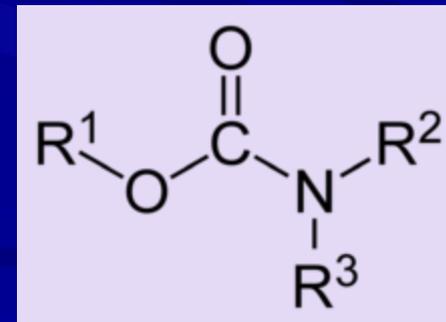
■ Differential diagnosis

– Cholinesterase inhibiting pesticides

■ Organophosphate pesticide

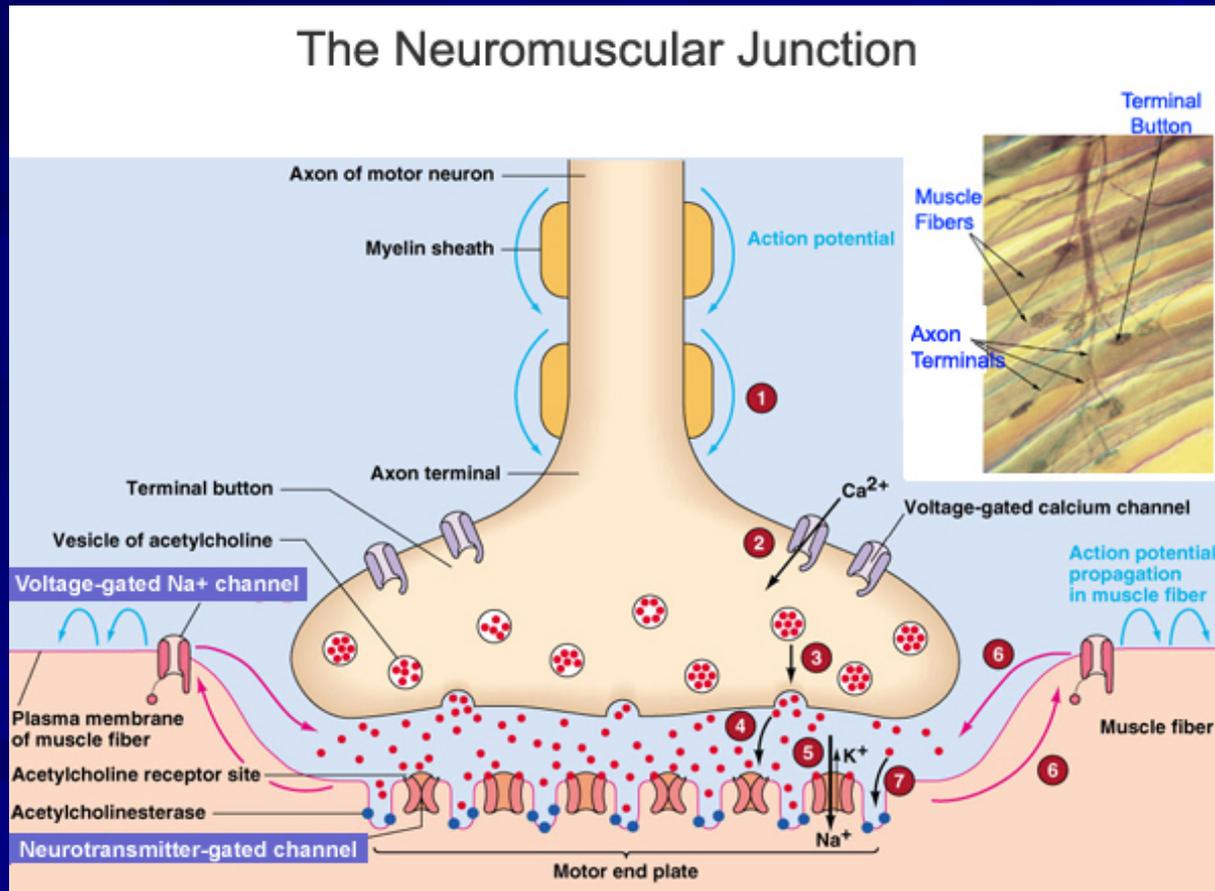


■ Carbamate Pesticides



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■ Cholinesterase Inhibiting Pesticides



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■ Carbamates vs Organophosphates

- Signs and symptoms are similar
- Blood cholinesterase levels return to safe levels faster with carbamates than with organophosphates
 - Hours to Days versus Days to Weeks
- Hospital was asked to determine blood cholinesterase levels

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■ Investigation

- Regional Food & Drug Staff visited the home
 - Interviewed the grandparents
 - Grand dad had a store receipt with the ingredients listed
 - Catfish nuggets, corn on the cob, cabbage, zucchini, carrots, potatoes, and cilantro
 - Obtained catfish nuggets and corn (from same lots) from the supermarket
 - Obtained approximately one quart of refrigerated soup

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■ Investigation

- DSHS Epidemiologist and Toxicologist inspected the house
- Alerted State Poison Control Centers
- Checked ER logs at local hospitals
- Checked the supermarket
- Soup sent to TDH(DSHS) laboratory to test for organophosphates

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■ Investigation

- No unusual findings in home
- No additional cases reported to Poison Control
- No additional cases found in hospital ER logs
- No unusual findings in supermarket

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■ Investigation

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■ Clinical Laboratory Evaluation

- RBC cholinesterase level 26 U/gmHb
 - Normal range 24 – 26
 - 48 hours post exposure

■ Laboratory Evaluation

- No OP pesticides found in the soup
- No OP pesticides found in fish
- No OP pesticides found in corn

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■ Continued Search for Pesticides

- DSHS laboratory not able to directly test for carbamates
- Continued search for a laboratory that could
 - Texas Department of Agriculture
 - Texas A&M University
 - Department of Public Safety Laboratory
 - University of Hawaii
 - FDA Laboratory
- Decided to confirm existence of toxicant in soup with an animal experiment

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■ Laboratory Evaluation

- Injected four mice IP with an extract of the fish soup (1 part diluent + 3 parts fish soup).
- Each mouse was injected with 0.4cc of the extract
- All mice were dead within 3-5 minutes of IP injection
 - Respiratory failure
 - Flaccid paralysis
- All mice frozen at -70C immediately

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■ **Laboratory Evaluation**

- Repeated with 6 more mice
 - 2 – plain extract as before
 - 2 – extract boiled 10 minutes
 - 2 – extract treated with trypsin for 30 minutes
- All mice died in the same time frame as the other mice
 - Exhibited seizures prior to death

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■ **Laboratory Evaluation**

- **Frozen mouse and frozen control sent to TAMU Veterinary Diagnostic Laboratory**
 - **Tested Brain Cholinesterase Activity**
 - **Levels relative to control confirm the treated animal had low**
 - **Consistent with cholinesterase inhibition**
 - **Consistent with Carbamate poisoning**

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■ **Laboratory Evaluation**

- 44 g frozen soup sent to FDA Forensic Chemistry Center
- FDA lab identified Aldicarb (trade name Temik) in the soup
- Tiny granules found in soup with microscopy
- Initial results approximately 15 mg/kg soup
- Later estimate 200 – 500 mg/kg soup

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■ **Laboratory Evaluation**

- Only one manufacturer of the product
- Sample sent to the manufacturer for testing
- Identified the granules as corn cob grit granules used as carrier for the pesticide
- Laboratory analysis confirmed concentration of 343 ppm in the soup

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■ Aldicarb

- Extremely toxic Carbamate Pesticide
- Systemic – gets into plants
- Approved for restricted use
- Not approved for vegetables

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■ Aldicarb

- Animal (rat) LD50 = 0.9 mg/kg
- Lowest dose associated with human illness = 0.0011 mg/kg

■ Estimating Exposure Dose

- 75lb **Child**: $(343 \text{ mg/kg} \times 0.5\text{kg})/34\text{kg} =$
 - **5.0 mg/kg**
- 150lb **Adult**: $(343\text{mg/kg} \times 0.5\text{kg})/70\text{kg} =$
 - **2.45 mg/kg**

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■ Was it contaminated Vegetables

– Not Likely

- Parent Compound

- Corn cob grit granules found in soup

- Extremely high concentration

- No other cases found in the community

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■ Was it an accidental in-home exposure?

– Not Likely

- No family member were licensed applicators
- No significant findings on home inspection
- TDA records – no dealers in the area have sold it in past 11 years
- There is a black market for the chemical
 - Ranchers have been known to spike meatballs with aldicarb to control coyotes and other predators
- Two formulations
 - One with graphite-gypsum granules (USA)
 - One with corn cob grit granules (Mexico)

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■ Criminal Investigation

- Local police interviewed family members
 - All deny adding anything to the soup
- Family files a lawsuit against the grocery store
- National chain grocery store
- Since lawsuit threatens interstate commerce, FDA Office of Criminal Investigation becomes involved

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■ Criminal Investigation

- All family members subjected to polygraph test
 - One family member fails when asked whether he added anything else to the soup
 - Shaken he claims to have picked some “yerba buena” (peppermint) from a neighbors yard and added it to the soup
 - Claimed to have noticed seeds on the ground, picked some up and added them to the soup (approx. ½ teaspoon)

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■ Criminal Investigation

- Neighbor uncooperative
- TDA inspector, escorted by local police took soil and plant samples from neighbors yard
- No trace of aldicarb found
- Inconclusive because of timing >90 days and neighbor would have had time to remediate

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■ Something's Fishy

- Aldicarb has a very high dermal toxicity – handling even a few granules could make one ill
- Aldicarb granules are tiny – about 1mm in diameter – unlikely someone picked a teaspoon of these seeds out of the dirt
- Both manufacturer and TDA skeptical of the “picking seeds” hypothesis

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■ Something's Fishy

- Aldicarb granules are tiny – about 1mm in diameter – unlikely someone picked a teaspoon of these seeds out of the dirt
- Aldicarb has a very high dermal toxicity – handling even a few granules could make one ill

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■ Conclusions

- “Picking up seeds” hypothesis could not be confirmed
- Local police did not have any further jurisdiction to pursue further
- Lawsuit was dropped so FDA/OCI no longer involved
- Family moved to parts unknown

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■ Laboratories Involved

- State Public Health Laboratory
- Texas Veterinary Medical Diagnostic Laboratory
- Texas Department of Agriculture Laboratory
- National Center for Environmental Health Laboratory
- Manufacturer A Laboratory
- Hospital Clinical Laboratory

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■ Acknowledgements