

# LEEDS INSULIN SERIAL KILLINGS



# INSULIN SERIAL KILLINGS

## SITUATION

- **A MALE NURSE TALKING TO HIS COLLEAGUES**
- **“CRISES ALWAYS OCCUR ON MY SHIFT”**
- **“MRS X LOOKS VERY POORLY”**
- **“I THINK THAT SHE WILL DIE AT 05.30 TOMORROW”**
- **PREDICTION IS BORN OUT**
- **NURSE SAYS “TOLD YOU SO!”**
- **SYMPTOMS: MASSIVE HYPOGLYCAEMIA REQUIRING 750 GRAMS OF GLUCOSE TO REVERSE**
- **DEATH OCCURS BY BRAIN DAMAGE**
- **AN INVESTIGATION IS TRIGGERED**
- **WHEN THE SUSPECT WAS TEMPORARILY TRANSFERRED TO ANOTHER HOSPITAL A SIMILAR DEATH OCCURRED**

# INSULIN SERIAL KILLINGS

## **INVESTIGATION**

- **A PANEL OF DOCTORS INVESTIGATES ALL DEATHS IN THE LAST FEW YEAR PERIOD FOR SIMILAR OCCURENCES**
- **SEVERAL ARE IDENTIFIED FOR FURTHER STUDY**
- **EXHUMATIONS ARE PERFORMED WHERE POSSIBLE**
- **BLOOD SAMPLES TAKEN FROM THE RECENTLY DECEASED ARE ANALYSED FOR INSULIN**
- **VERY HIGH LEVELS ARE FOUND**
- **BUT BY A NON SPECIFIC METHOD**
- **WITHOUT CONFIRMATION THE IDENTIFICATION IS IN DOUBT**

# INSULIN SERIAL KILLINGS

## OUR INPUT

- **SIX MONTHS BEFORE TRIAL WE RECEIVE INSTRUCTION**
- **TECHNOLOGY IS AVAILABLE FOR INSULIN CONFIRMATION BY HPLC MS MS**
- **THE TECHNIQUE IS HOWEVER VERY INSENSITIVE (requires large several millilitres blood volumes)**
- **I PREDICT THAT I WILL BE ABLE TO CONFIRM THE PRESENCE OF INSULIN (if present) AND ALSO TO IDENTIFY THE INSULIN TYPE FROM A GROUP OF 8 SYNTHETIC VARIANTS**



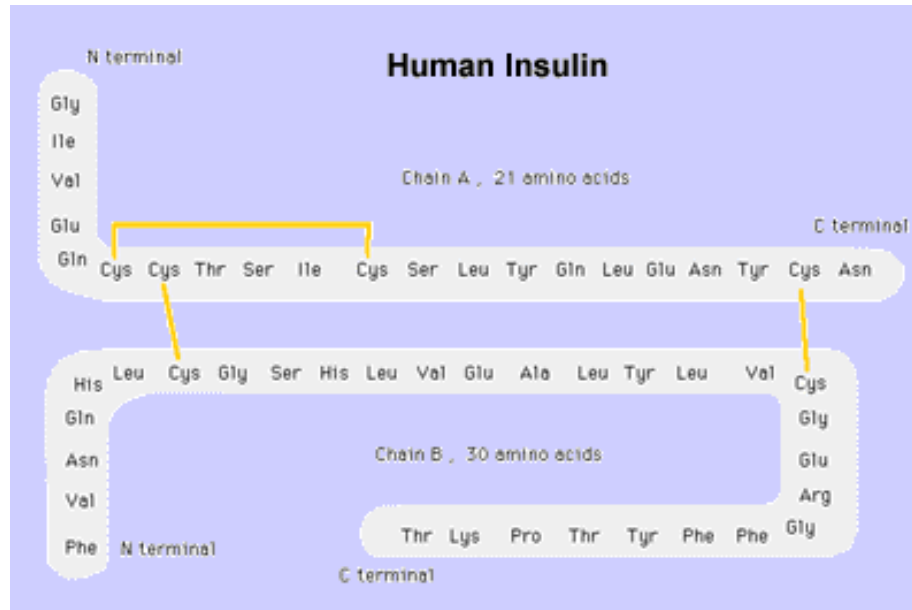
# INSULIN SERIAL KILLINGS

## WHAT IS INSULIN?

- **A NON CONJUGATED GLOBULAR PROTEIN**
- **AVERAGE MOLECULAR WEIGHT: 5807**
- **USUAL CONCENTRATION IN BLOOD:**  
***A FEW NANOGRAMS PER MILLILITRE***
- **TRIGGERS THE UPTAKE OF GLUCOSE INTO LIVER AND MUSCLE AND STORAGE AS GLYCOGEN**

# INSULIN SERIAL KILLINGS

## STRUCTURE OF INSULIN



# PROPERTIES OF INSULIN

## **TOXICOLOGICAL PROPERTIES**

- **IN EXCESS WILL REMOVE GLUCOSE FROM THE BLOOD**
- **THE BRAIN CAN ONLY METABOLISE GLUCOSE**
- **IN EXCESS BRAIN DAMAGE AND DEATH RESULTS**

# INSULIN SERIAL KILLINGS

## **ANALYTICAL PROBLEMS**

- **NO METHOD EXISTS FOR DETECTION AT THE NANOGRAM LEVEL**
- **THE ANALYSIS IS THE FORENSIC TOXICOLOGIST'S HOLY GRAIL**
- **A NEW POTENTIAL TECHNIQUE IS AVAILABLE AND IS USED FOR ANALYSIS OF TRYPTIC DIGESTS**
- **THIS TECHNIQUE IS ENABLING PROGRESS IN THE NEW FRONTIER OF SCIENCE**
- **THE UNDERSTANDING OF THE PROTEOME**
- **IE THE STRUCTURE AND FUNCTION OF THE THOUSANDS OF PROTEINS PRESENT IN THE HUMAN CELL**
- **IT IS UNKNOWN IF IT WILL WORK FOR SUCH A HEAVY PROTEIN AS INSULIN**



# INSULIN SERIAL KILLINGS

## ANALYSIS

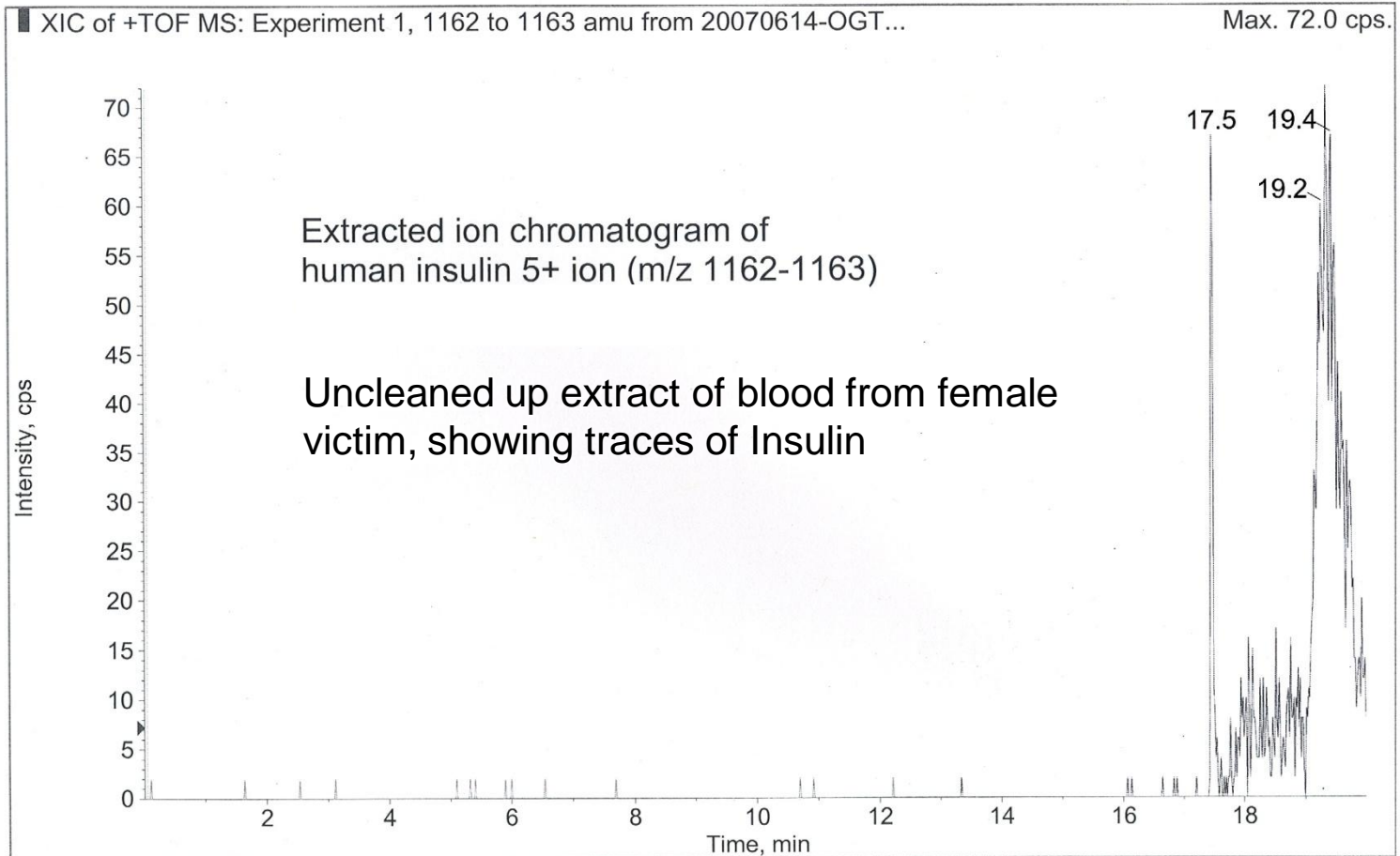
- **A LAB IS FOUND WITH THE NECESSARY EQUIPMENT**
- **A SYSTEM IS SET UP OVER A TWO DAY PERIOD**
- **ON THE FIRST DAY A JUDGE ORDERS ME TO TAUNTON CROWN COURT TO GIVE EVIDENCE IN ANOTHER CASE**
- **THE SAMPLE IS PRESENTED BY THE EXHIBIT OFFICER**
- **THE TUBE IS EMPTY**
- **AN EXTRACT IS PREPARED**
- **ANALYSIS REVEALS THE PRESENCE OF A FEW NANOGRAMS OF LIKELY HUMAN INSULIN**

# INSULIN SERIAL KILLINGS

## ANALYSIS

Acq. Date: Thursday, June 14, 2007

Acq. Time: 18:38

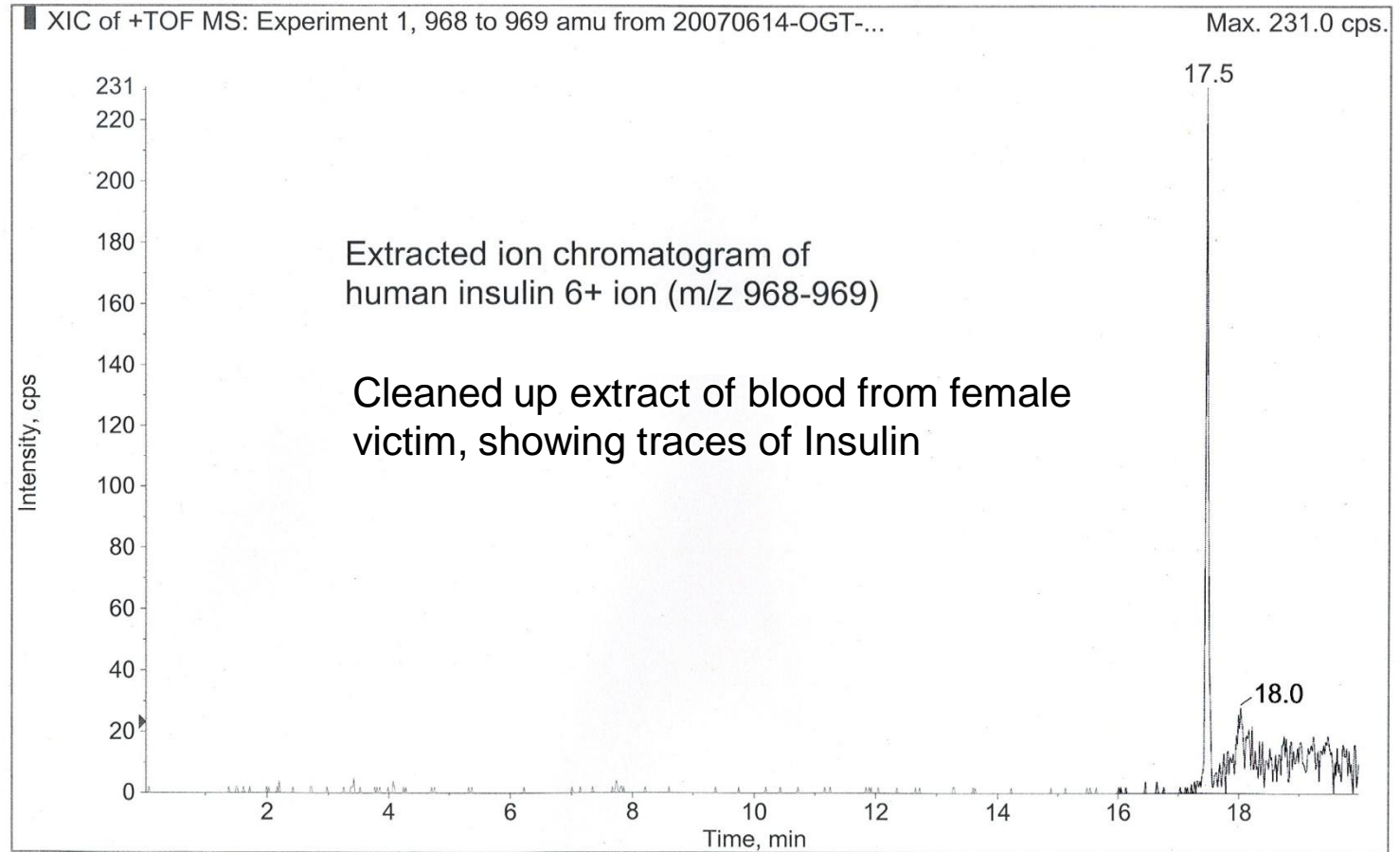


# INSULIN SERIAL KILLINGS

## ANALYSIS

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Acq. Time: 18:38



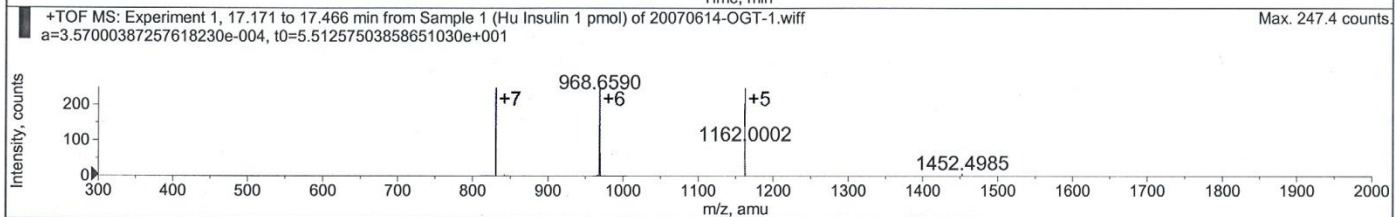
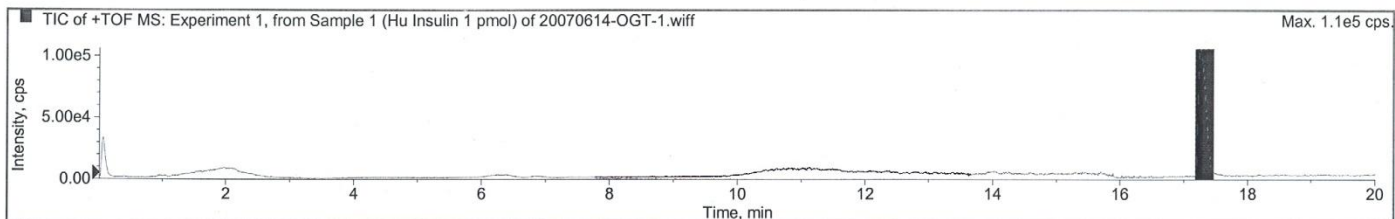
# INSULIN SERIAL KILLINGS

## ANALYSIS

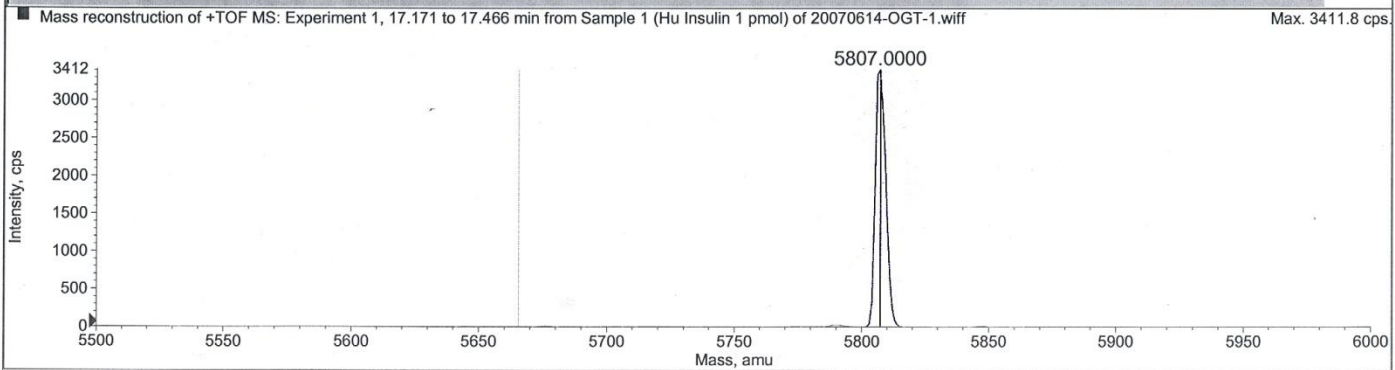
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 Sample Name: Hu Insulin 1 pmol

Scan Type: Positive

Date: Thursday, June 14, 2007



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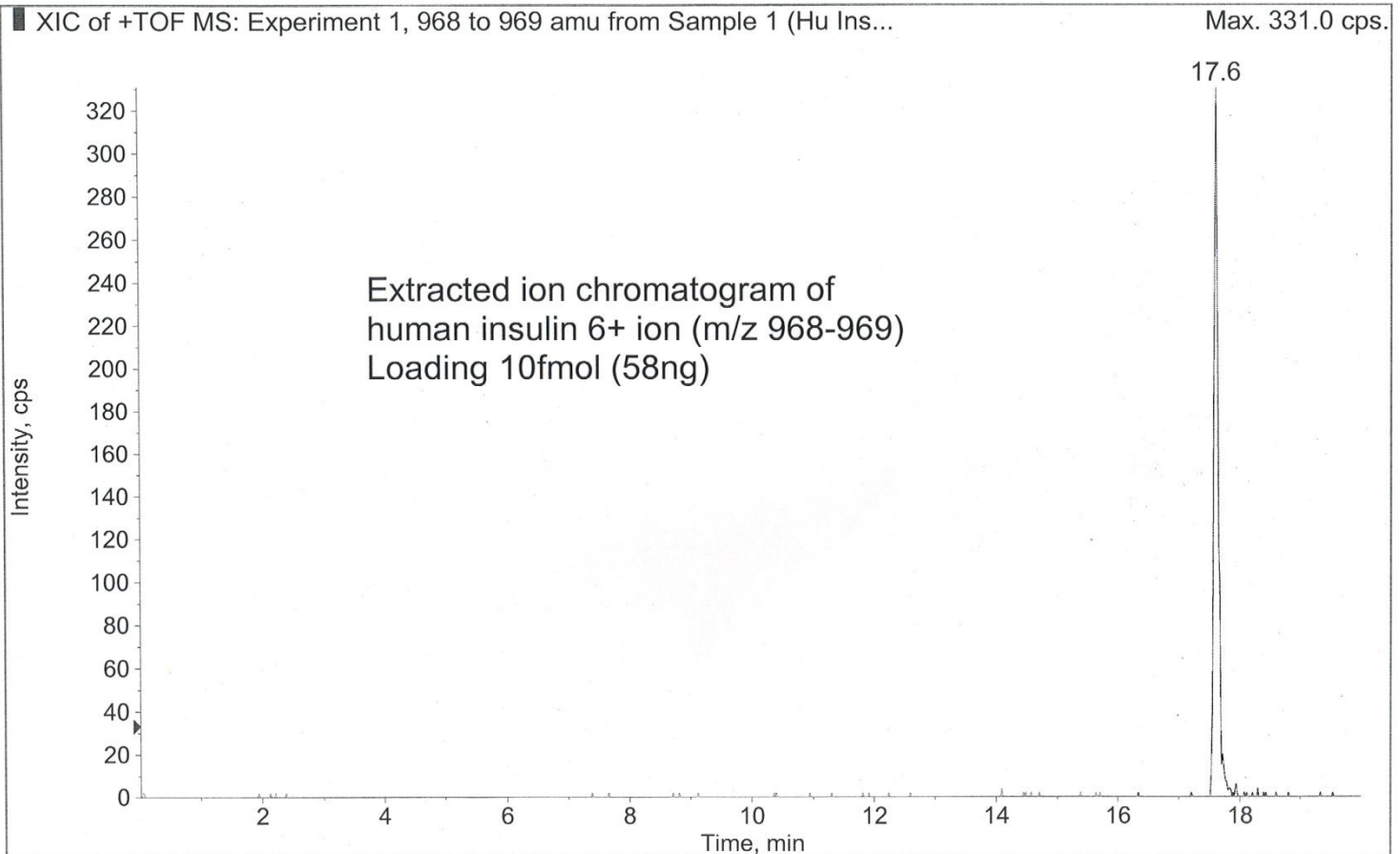
Printing Date: June 14, 2007

# INSULIN SERIAL KILLINGS

## ANALYSIS

Acq. Date: Thursday, June 14, 2007

Acq. Time: 12:35



# INSULIN SERIAL KILLINGS

## ANALYSIS

- **THE FACT THAT THE TUBE WAS EMPTY MAY HAVE PRESERVED THE TRACES OF INSULIN IN DRY FORM**
- **INSULIN IS RAPIDLY DESTROYED IN LIQUID BLOOD**
- **THE SAMPLE HAD NOT BEEN STORED ALWAYS REFRIGERATED**

# INSULIN SERIAL KILLINGS

## CONCLUSION

- **THE SAMPLE WAS 4.5 YEARS OLD**
- **YET STILL INSULIN WAS DETECTED**
- **ONE INTERPRETATION IS THAT AN EXTRAORDINARILY HIGH LEVEL MAY HAVE BEEN PRESENT IN THE ORIGINAL BLOOD**
- **INSULIN WAS WIDELY AND FREELY AVAILABLE IN THE HOSPITAL (700 vials per month)**
- **INSULIN IS NOW STORED UNDER LOCK AND KEY**

# INSULIN SERIAL KILLINGS

## RESULT

- **DEFENDANT JAILED FOR LIFE**
- **INSULIN IS NO LONGER UNDETECTABLE AND UNCONFIRMABLE BY FORENSIC ANALYSIS EVEN IN VERY OLD SAMPLES**



## CASE 2

# CAMPHOR CHILD DEATH IN SOUTHALL

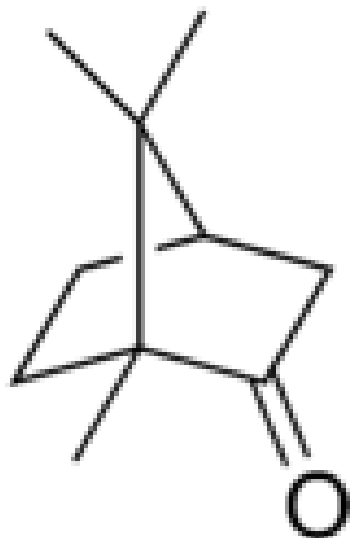


# PROPERTIES AND ORIGINS OF CAMPHOR

- **PRODUCED IN THE BARK OF THE CAMPHOR TREE  
(+) ENANTIOMER**



# PROPERTIES AND ORIGINS OF CAMPHOR



**•SYNTHETICALLY PRODUCED  
((+)(-)) RACEMIC (50:50) MIXTURE**

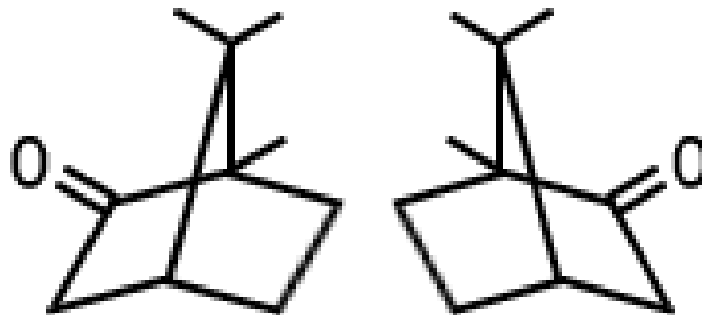
# PROPERTIES AND ORIGINS OF CAMPHOR

- **USED WIDELY IN SRI LANKAN RELIGIOUS CEREMONIES BY BURNING AS INCENSE**
- **USED IN SINUS CLEARING MEDICINES (e.g. A CHEST RUB) *TO CLEAR CONGESTION***
- **A COMMON CONSTITUENT (at very low levels) IN HERBS AND SPICES**

# PROPERTIES AND ORIGINS OF CAMPHOR

## CAMPHOR STRUCTURE

**(+)ENANTIOMER    (-)-ENANTIOMER**



# PROPERTIES AND ORIGINS OF CAMPHOR

## PHARMACOLOGICAL PROPERTIES

- **IN SMALL DOSES A RUBEFACIENT**
- **FUNCTIONS BY IRRITATING THE AIR PASSAGES  
PRODUCING FRESH MUCUS THAT DISPLACES  
SOLIDIFIED BLOCKAGES**

# PROPERTIES AND ORIGINS OF CAMPHOR

## **TOXICOLOGICAL PROPERTIES**

- **IN HIGH DOSES A NEURO AND HEPATOTOXIN**
- **CAUSES SEIZURES AND CESSATION OF BREATHING IN INFANTS AND TODDLERS**

# PROPERTIES AND ORIGINS OF CAMPHOR

## **CASE CIRCUMSTANCES**

- **20 DAY OLD NEONATE (newborn)**
- **GROWTH OF CHILD ORGANS IN UTERO SACRIFICED TO ENSURE FULL BRAIN DEVELOPMENT**
- **THE LIVER IS UNDEVELOPED**
- **CHEST INFECTION**
- **LANDLADY SUGGESTS TREATMENT WITH CAMPHOR (A Sri Lankan herbal remedy)**



# CAMPBOR CHILD DEATH

## **BEGINNINGS OF TROUBLE**

- **HERBAL REMEDY INVOLVES PLACING 10 GRAM CEREMONIAL BLOCKS OF (+)(-) CAMPHOR IN A PAN OF BOILING OIL**
- **CHILD PLACED ON A BED IN A SMALL ROOM WITH WITH THE PAN OF BOILING OIL**
- **EXPERIMENTS SHOWED FORMATION OF A DENSE SMOKE FILLING A SIMILAR SIZED ROOM**
- **TREATED FOR 90 MINUTES**
- **CHILD CEASES BREATHING**



# CAMPHOR CHILD DEATH



# CAMPHOR CHILD DEATH

## **COMPOUNDING FEATURES**

- **TOTAL PANIC**
- **PARENTS AND NEIGHBOURS SHAKE CHILD TO REVIVE**
- **ARTIFICIAL RESUSCITATION APPLIED TO CHEST BY PARENTS AND NEIGHBOURS**

# CAMPBOR CHILD DEATH

## **THE PROBLEMS BEGIN**

- **MEDICS IDENTIFY INJURIES SUCH AS CRUSHED RIBS AND NECK TRAUMA**
- **IDENTIFIED INITIALLY AS RESULTING FROM ABUSE BY SHAKING AND CRUSHING**
- **ACCUSATION OF MURDER**
- **PARENTS HELD IN HIGH SECURITY PRISONS**

# CAMPHOR CHILD DEATH

- **PARENTS HELD IN HIGH SECURITY PRISONS**
- **SOLICITOR CONTACTS US THREE DAYS BEFORE TRIAL BEGINS AT OLD BAILEY**
- **QUITE NORMAL SITUATION**

# CAMPHOR CHILD DEATH

## **OUR NORMAL MODUS OPERANDI**

- **NO TIME**
- **NO MONEY**
- **NO SAMPLE**



# CAMPHOR CHILD DEATH

## **OUR MISSION**

**TO ASSIST INDEPENDENTLY AND  
IMPARTIALLY IN ELUCIDATING AND  
PRESENTING ANY SCIENTIFIC ASPECTS  
OF THE CASE TO THE COURT**



# CAMPHOR CHILD DEATH

**THE IMPOSSIBLE IS NORMAL**





# CAMPHOR CHILD DEATH

## **ANALYSIS**

- **SPARSE LITERATURE SHOWS CAMPHOR TO BE A HIGHLY SUSPECT NEUROTOXIN**
- **ESPECIALLY IN YOUNG CHILDREN**
- **CAUSING SEIZURES AND CESSATION OF BREATHING**
- **DOCTORS ARE CALLING FOR CAMPHOR TO BE ELIMINATED FROM ALL MEDICINES**
- **ONE FATALITY IN INDUSTRY PRODUCTION REVEALS A POSSIBLE SYMPTOM OF A LOCKED JAW POST MORTEM**



# CAMPHOR CHILD DEATH

## EXPERIMENTAL RESULTS

- **10 GRAMS OF CAMPHOR PLACED IN BOILING OIL RELEASES 8 GRAMS IN A FEW MINUTES**
- **THE DENSE SMOKE PRODUCED FILLS A SMALL ROOM IN A FEW MINUTES**
- **SMOKE IS SO DENSE THAT VISION IS TOTALLY OBSCURED**
- **GC/MS SHOWS CAMPHOR TO BE THE SYNTHETIC (+)(-) MIXTURE OF ENANTIOMERS**
- **THUS WE HAVE TWO TOXIC COMPOUNDS TO CONSIDER**
- **ALL RESEARCH SO FAR CARRIED OUT ON (+) ENANTIOMER**
- **TOXICITY OF (-) ENANTIOMER UNKNOWN**

# CAMPBOR CHILD DEATH

## **CLINCHING PROOF**

- **CIRCUMSTANCES OF THE LIKELY HIGH DOSE OF AEROSOL IN SMALL ROOM FOR A PROLONGED PERIOD**
- **PARAMEDIC REPORTS CHILDS JAW IS LOCKED WHEN RESUSCITATION IS APPLIED**
- **LITERATURE CONCERNS**
- **MEDICAL SYMPTOMS LIKELY TO HAVE ORIGINATED FROM OVER ENTHUSIASTIC ATTEMPTS AT RESUSCITATION**
- **THE RESPONSE TO A CHILD NOT RESPONDING SHOWN TO BE A NATURAL AND DANGEROUS SHAKING OF THE CHILDS BODY WHICH CAN CAUSE SERIOUS NECK INJURY**
- **EVEN PROFESSIONALS SHOWN TO DO THIS WHEN PANICKING**

# CAMPHOR CHILD DEATH

## **OUTCOME**

- **DEFENDANT'S WERE IN HIGH SECURITY PRISONS BEFORE TRIAL**
- **FACING LIFE IN PRISON**
- **DEFENDANT'S ARE ACQUITTED**



# CAMPHOR CHILD DEATH

## POSTSCRIPT

- **COUPLE HAVE A SECOND CHILD**
- **ATTEMPT MADE IN HIGH COURT TO TAKE CHILD INTO CARE**
- **14 DAYS BEFORE TRIAL WE ARE INSTRUCTED**
- **PREPARATIONS MADE TO ANALYSE FROZEN LUNG TISSUE FOR BORNEOL ENANTIOMERS**
- **THESE ARE METABOLITES PRODUCED FROM CAMPHOR  
(by microbiological action)**
- **JUDGE DISMISSES CASE AS NOT IN THE CHILD'S BEST INTEREST**

