Identification of blood as Red pigment:

Forensic blood identification involves a two-step process: presumptive testing to suggest the presence of blood, followed by confirmatory testing to confirm it is human blood and differentiate it from other substances.

يتضمن التعرف على الدم جنائيا **عملية من خطوتين**: الاختبار **الافتراضي للإشارة إلى وجود الدم**، يليه اختبار تأكيدي ل**تأكيد على أنه دم بشري** وتمييزه عن المواد الأخرى.

Common presumptive tests include the:-

1. Kastle-Meyer test, which relies on the reaction of hemoglobin to produce a pink color.

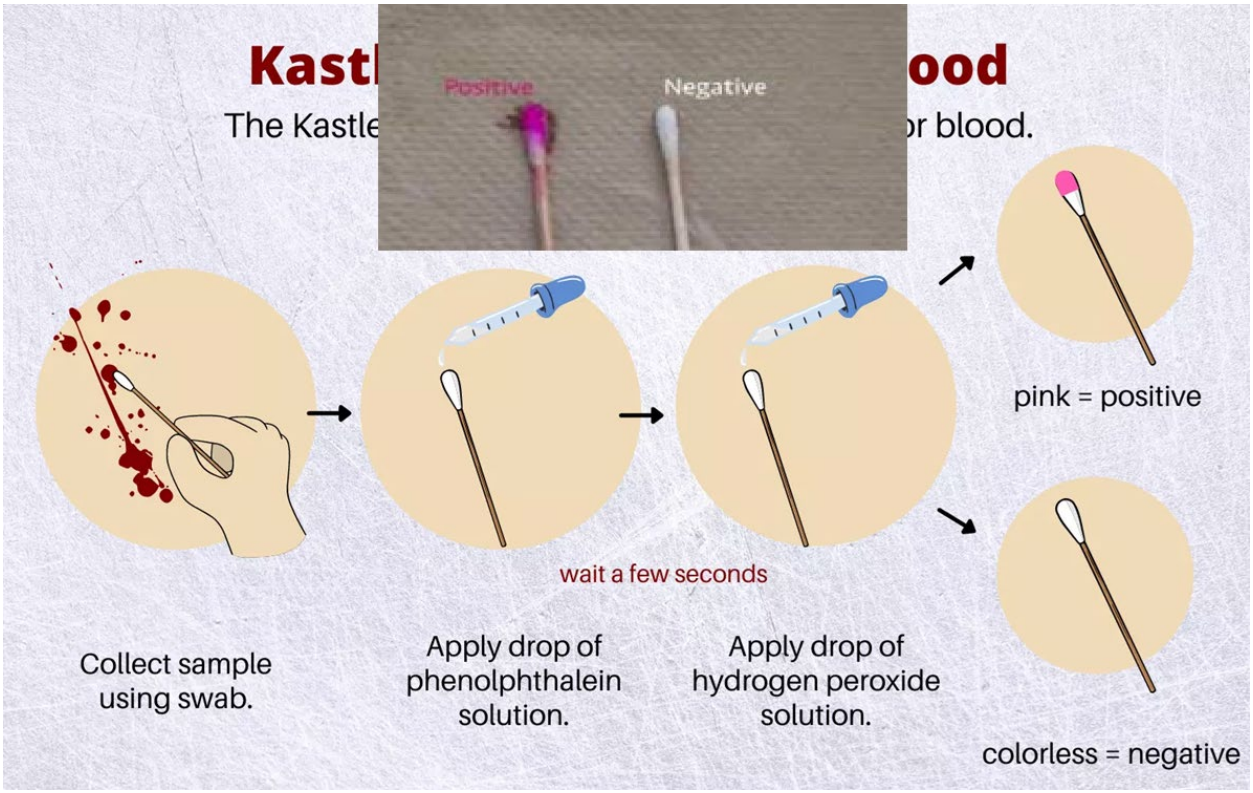
Is the primary test commonly accrue in crème scene, and **works by using the peroxidase-like activity of hemoglobin in blood** to **catalyze a reaction that turns a colorless reagent (phenolphthalin) into a pink,** oxidized form (phenolphthalein) when a few drops of hydrogen peroxide are added.

يعمل هذا الاختبار باستخدام نشاط الهيموغلوبين الشبيه بالبيروكسيديز **(يعمل عمل بيروكسيد الهيدروجين لكنة بتاثير انزيزيمي)** في الدم لتحفيز تفاعل يُحوّل كاشفًا عديم اللون (فينولفثالين) إلى شكل وردي مؤكسد (فينولفثالين) عند إضافة بضع قطرات من بيروكسيد الهيدروجين.

NOT: t**he test is a useful preliminary field test, a positive result only indicates the presence of a substance with peroxidase activity, such as blood, But (((((can also be caused by other oxidizing agents or certain plant materials))))).**

على الرغم من أن الاختبار هو اختبار ميداني أولي مفيد، لكن (((((النتيجة الإيجابية تشير فقط إلى وجود مادة ذات نشاط بيروكسيديز، مثل الدم، ويمكن أن تحدث أيضًا بسبب عوامل مؤكسدة أخرى أو مواد نباتية معينة))))).

$$Fe^{+4} + H_2O_2 + C_2OH_{14}O_4 \longrightarrow C_2OH_{14}O_4 + H_2O + Fe^{+3}$$



2. Luminol tests, which reveal hidden blood through a chemiluminescent glow.

luminol identifies blood by emitting a blue-white light when **it comes into contact with the iron in hemoglobin.** This chemiluminescent reaction **allows investigators** to visualize even (((tiny or hidden blood traces that are invisible to the naked eye, often after attempts to clean them have been made.

يُحدد اللومينول الدم عن طريق إصدار ضوء أزرق-أبيض عند ملامسته للحديد في الهيموغلوبين. **يتيح هذا التفاعل الكيميائي الضوئي للباحثين رؤية حتى آثار الدم الصغيرة أو الخفية التي لا تُرى بالعين المجردة، وغالبًا ما يتم ذلك بعد محاولات تنظيفها.**

NOT:-While it is a **highly sensitive** and **valuable presumptive** test for blood, **{{{ luminol can produce false positives with other substances like copper compounds or bleaches and can negatively affect subsequent DNA analysis}}}.**

على الرغم من أن اللومينول هو اختبار افتراضي عالي الحساسية وقيم للدم، {{{إلا أنه يمكن أن ينتج نتائج إيجابية خاطئة مع مواد أخرى مثل مركبات النحاس أو المبيضات ويمكن أن يؤثر سلبًا على تحليل الحمض النووي اللاحق}}}}.

Poisons: (Toxicology)

Toxicology is the study of the adverse effects of chemical, physical, or biological agents on living organisms and the ecosystem, including the prevention and amelioration of such adverse effects.

Toxicology is an applied science with many areas of specialization. Toxicology involves integration of information from many different areas of expertise. **Most toxicologists work to assess and understand how chemicals affect living systems, and their work involves:**

علم السموم علم تطبيقي ذو تخصصات متعددة. يتضمن علم السموم دمج المعلومات من مختلف مجالات الخبرة. يعمل معظم علماء السموم على تقييم وفهم كيفية تأثير المواد الكيميائية على الأنظمة الحية، ويشمل عملهم ما يلي:

1. **Developing mechanistic understanding of effects**
2. **Ensuring safer chemical products**
3. **Developing safer drugs and medicines**
4. **Determining risks from chemical exposures**
5. **Developing treatments for chemical exposures**
6. **Ensuring a safe food and water supply**

THE PRIMARY LAW :

Paracelsus stated that, “All substances are poisons; there is none which is not a poison.” If the right dose is taken, it could become a remedy, otherwise poisonous.

قال باراسيلسوس: "جميع المواد سموم؛ لا يوجد شيء خالٍ من السم". إذا تم تناول الجرعة الصحيحة، فقد تصبح علاجًا، وإلا فهي سامة.

Action of poisons

Every poison has almost similar action on the victim's body. In many cases, they either stop the transfer of O2 to the tissues or create an obstacle in the respiratory system by inhibition of enzymes which are associated with the process.

the myoneural junction and the ganglions and synapses are the sites of action. In some cases of insecticidal poisoning, hyperexcitement of voluntary and involuntary muscles can cause death.

الوصلة العضلية العصبية والعقد العصبية والمشابك العصبية هي مواقع التأثير. في بعض حالات التسمم بالمبيدات الحشرية، قد يؤدي فرط إثارة العضلات الإرادية واللاإرادية إلى الوفاة.

There are four categories of action of poisons—

(i) local action, (ii) remote action, (iii) local and remote actions, and (iv) general action.

Local action: means direct action on the affected site of the body.

يعني التأثير المباشر على المنطقة المصابة من الجسم.

Examples include irritation and inflammation in strong mineral acids and alkalis, congestion and inflammation by irritants, the effect on motor and sensory nerves, etc.

ومن الأمثلة على ذلك التهيج والالتهاب الناتج عن الأحماض والقلويات المعدنية القوية، والاحتقان والالتهاب الناتج عن المهيجات، والتأثير على الأعصاب الحركية والحسية، إلخ.

Remote action: affects the person due to absorption of that poison into the system of that person.

يؤثر على الشخص نتيجة امتصاص ذلك السم في جسمه.

For example, alcohol is absorbed in the system and then it affects the person.

على سبيل المثال، يمتص الجسم الكحول ثم يؤثر على الشخص.

Local and remote actions: Some poisons can affect both local and remote organs.

بعض السموم قد تؤثر على الأعضاء الموضعية والبعيدة.

Thus, they not only affect the area with contact to the poison but also cause toxic effect after absorption into the system, for example, oxalic acid.

وبالتالي، فهي لا تؤثر فقط على المنطقة الملامسة للسم، بل تُسبب أيضًا تأثيرًا سامًا بعد امتصاصه في الجسم، مثل حمض الأكساليك.

General action: General action means the absorbed poison affects more than one system of the body, for example, mercury, arsenic, etc.

الفعل العام يعني أن السم الممتص يؤثر على أكثر من نظام في الجسم، على سبيل المثال، الزئبق، الزرنيخ، وما إلى ذلك.

Factors modifying the action of poisons:

Toxicity of a poison depends upon its inherent properties such as physiochemical as well as pharmacological properties. The action of poisons mainly depends upon the following factors discussed below:

1.Forms of poison: There are three forms of poison:

- **Physical form: Gaseous/volatile/vaporous forms of poisons act faster than liquid poisons as they are quickly absorbed. Similarly, liquid poisons act faster than solid poisons.**

Gaseous or volatile > liquid > solid.

For solid poisons, powdered poisons act quickly than the lumps. For example, there are certain seeds that escape the gastrointestinal tract as they are solid, but when crushed, they can be fatal. For solids: powdered > lumps

- **Chemical form: Few substances like mercury or arsenic are not poisonous as they are insoluble and cannot be absorbed when they are in combination with other substances like mercuric chloride, arsenic oxide, etc. In other cases, the action is vice versa.**

بعض المواد، مثل الزئبق والزرنيخ، ليست سامة، لأنها غير قابلة للذوبان ولا تُمتص عند مزجها مع مواد أخرى مثل كلوريد الزئبق وأكسيد الزرنيخ، إلخ. في حالات أخرى، يكون التأثير عكسيًا.

For example, there are some substances that become inert in combination with silver nitrate and hydrochloric acid and are deadly and poisonous when present in pure forms.

على سبيل المثال، هناك بعض المواد التي تصبح خاملة عند مزجها مع نترات الفضة وحمض الهيدروكلوريك، وتكون قاتلة وسامة عند وجودها في صورها النقية.

• Mechanical combination: The effect of poisons is significantly altered when they are combined with inert substances.

2.Quantity: Large doses of toxin cause much lethal effect. But this statement is not always true.

For example, sometimes when a toxin is taken in very large amount, the body produces a mechanism against it such as vomiting, and thus the intensity of the toxin is reduced.

3.Concentration: The absorption speed of poison is dependent on concentration; thus poison of higher concentration is fatal. However, there are still some exceptions. For example, a dilute oxalic acid is less corrosive, but the absorption rate is high and so it is more dangerous.

على سبيل المثال، حمض الأكساليك المخفف أقل تآكلاً، ولكن معدل الامتصاص مرتفع وبالتالي فهو أكثر خطورة.

4.Methods of administration: It has a unique role in the process of absorption. It is fastest through inhalation and then through injection as compared to the oral mode.

5.Condition of the body: Different persons react differently when exposed to a poison. It is because the condition of our body is also responsible for the increase or decrease of the effect of a poison on the body:

-Age: Children and older people are more affected than an adult by the same quantity of toxin.

-Sleep: The body functions are slower during sleep; thus toxin circulation in the body is also slower.

-Health: Healthy persons can tolerate a toxin better than a weak or ill person.

6.Dosage: The effect of the poison depends upon its dosage. It is said that the dose determines whether a substance is a poison or remedy. A substance is usually considered a poison after a certain fixed quantity. Although this quantity is not fixed for all people, it is considered according to the average effect on the population. There are two considerable effects of poison on the body of a person; these are the subtle long-term chronic toxicity and immediate fatality.

***Effective dose (ED): The effective dose is the quantity of a substance at which it shows its effect in the population.**

In most cases, ED50 is measured as a dose which induces a response in half of the targeted population.

***** Lethal dose: The lethal dose (LD) 50 is the amount of drug which is expected to cause death of 50% population.**