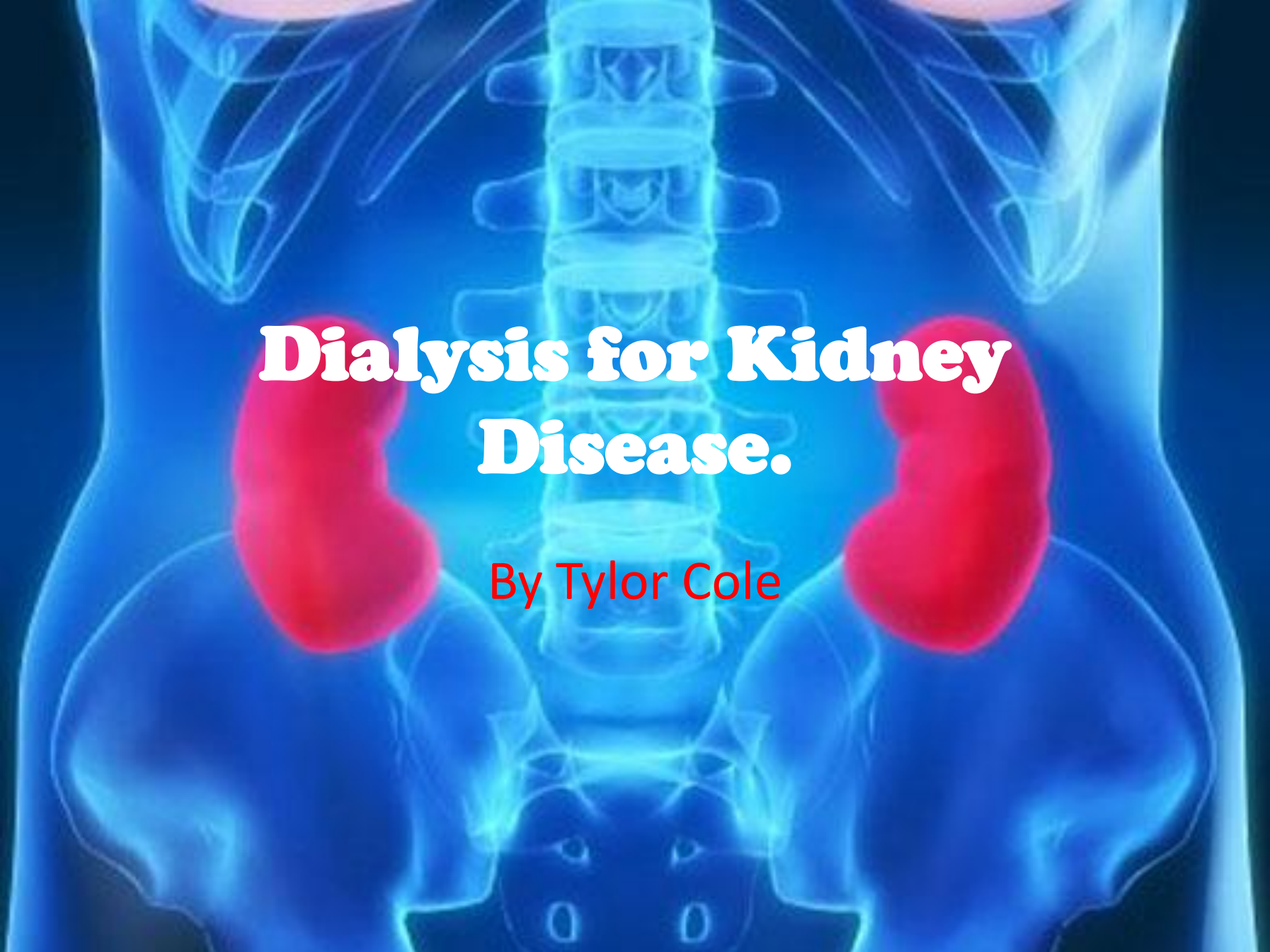
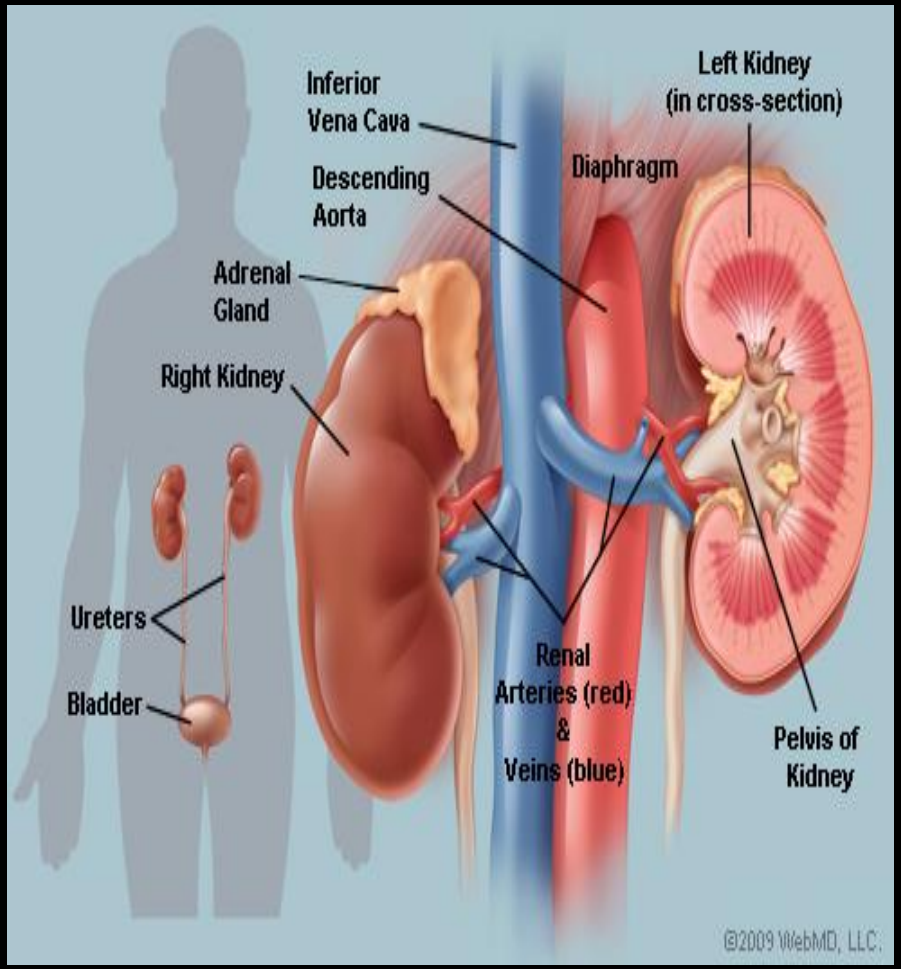


Dialysis for Kidney Disease.

By Tylor Cole

The Kidneys

- The kidneys are two bean- shaped organs that rest against the back muscles in the upper abdominal cavity. They are located on both sides of the spine.
- The kidneys are there to extract waste from blood, balance body fluids and acid in other important functions of the body, and form urine.
- The kidneys have four functions:
  - **Waste excretion**
  - **Water level balancing**
  - **Blood pressure regulation**
  - **Red blood cell regulation**
  - **Acid regulation**



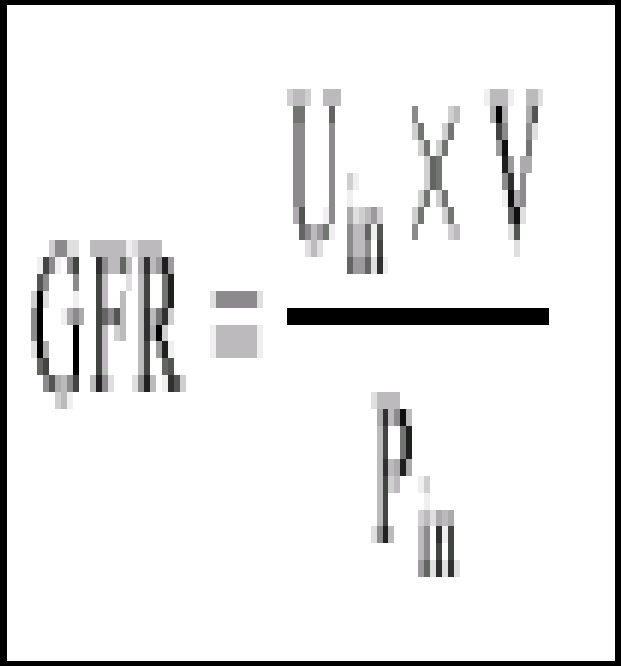
Chronic Kidney Disease

- Chronic Kidney Disease evolves from Acute Kidney Failure which is the condition when the kidneys can no longer function the way they should.
- Chronic kidney disease is caused by:
  - Infection
  - Blood-clotting disorders
  - Decreased blood flow caused by low blood pressure
  - Acute tubular necrosis, or death of the tubular cells that deliver urine to the ureters
  - Autoimmune kidney disorders
  - Urinary tract infections
  - Complications from pregnancy

Symptoms Of CKD

- Symptoms of chronic kidney includes:
  - Changes in urination
  - Swelling of the feet, ankles, hands or face
  - Fatigue or weakness; shortness of breath.
  - Ammonia breath or an ammonia or metal taste in the mouth
  - Back or flank pain
  - Itching; loss of appetite
  - Nausea and vomiting
  - Hypoglycemic episodes if diabetic.

Stages Of CKD



- To keep CKD under control the National Kidney Foundation (NKF) created a 5 stage guideline to help doctors identify each level of kidney disease.
- The Glomerular filtration rate (GFR) is used to determined the stages of CKD. GFR is used to measure the amount of creatinine in the blood.
- A mathematic equation is used to estimate GFR. In addition to serum creatinine, other factors in the equation includes age, face and gender.
  - Stage one: has kidney damage with a GFR at a normal or high level greater than 90 ml/min. They don't have any symptoms to indicate the kidneys are damaged.
  - Stage two: has kidney damage with a mild decrease in their GFR of 60-89 ml/min.
  - Stage three: has kidney damage with a moderate decrease in the GFR of 30-59 ml/min. The kidney function starts to decline, and waste product start to built up in the blood causing a condition known as "uremia."
  - Stage four: has advanced kidney damage with a severe decrease in the GFR to 15-30 ml/min. Patient is put on dialysis
  - Stage five: has end stage renal disease (ESRD) with a GFR of 15 ml/min or less. At this stage of kidney disease the kidneys have lost almost all their ability function effectively. Dialysis or a kidney transplant is needed to live.

Dialysis

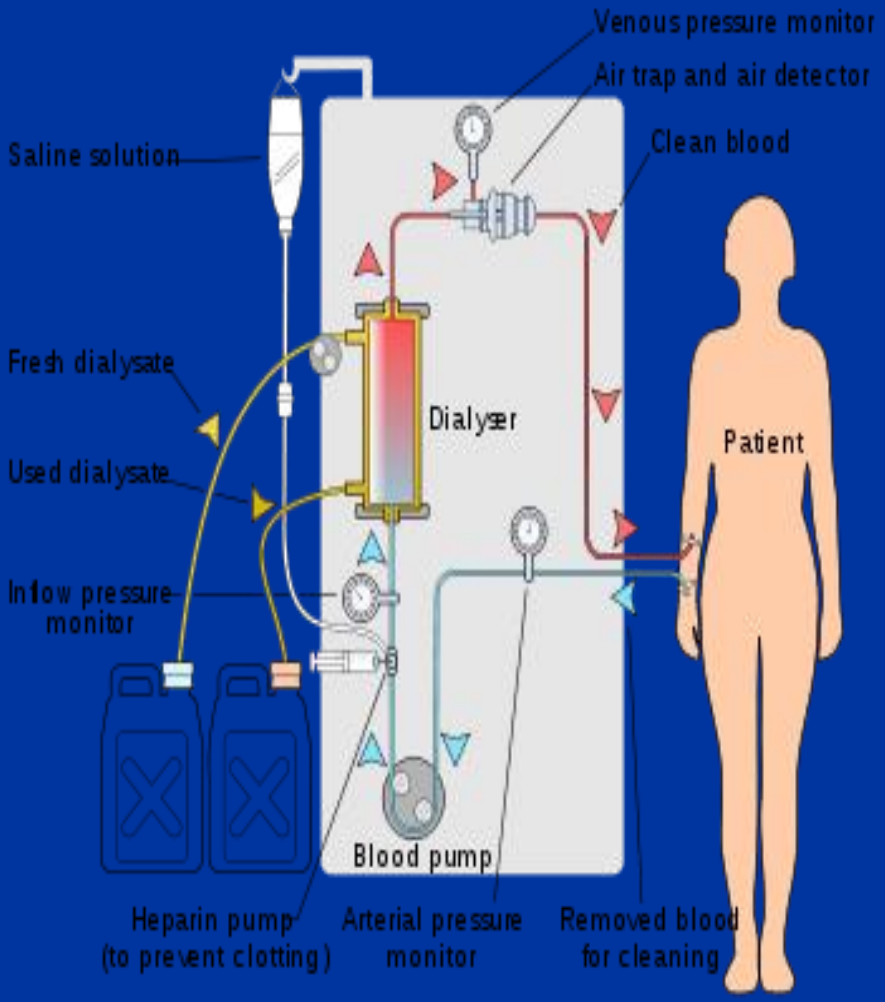
- At stage four and five patients are put on dialysis because the kidney can no longer function regularly.
- Dialysis is a treatment to replace filtering function of the kidneys when they reach end stage renal disease.
- Dialysis helps remove waste from the blood and it works as an artificial replacement of lost kidney function through the process of diffusion of solutes and ultrafiltration of fluid across a semi-permeable membrane .

History of Dialysis

- The first dialyzer was created by Dr. Willem Kolff, a Dutch physician who used sausage casing, beverage cans, washing machine and other available items.
- For the first two years Dr. Kolff used the machine on 16 patients with Acute Kidney Disease, but it was a failure.
- In 1945 he did a retrial on a 67-year-old woman who went through 11 hours of dialysis everyday and she lived for 7 more years
- In 1968, Henry Tenckhoff invented another form of dialysis treatment that could remain in patient's abdomen permanently, instead of being inserted for every treatment.
- There are two types of dialysis:
  - Hemodialysis
  - Peritoneal dialysis

Hemodialysis

- The dialyzer is made up of thousands of tiny synthetic hollow fibers which acts as the semipermeable membrane.
- Patient's blood is pumped through the blood compartment of a dialyzer, exposing it to a partially permeable membrane.
- The blood flow through the fiber and the dialysate solution flows on the outside of the fiber.
- The blood travels to and from the dialysis machine in large volume and high speed so that toxins, waste, and extra fluid can be removed from the body.
- The clean blood then flows back into the body.
- The procedure of hemodialysis is done 2 – 3 times a week in the hospital. Since 2007 over 25, 000 patients have been going through the treatment in the comfort of their home.



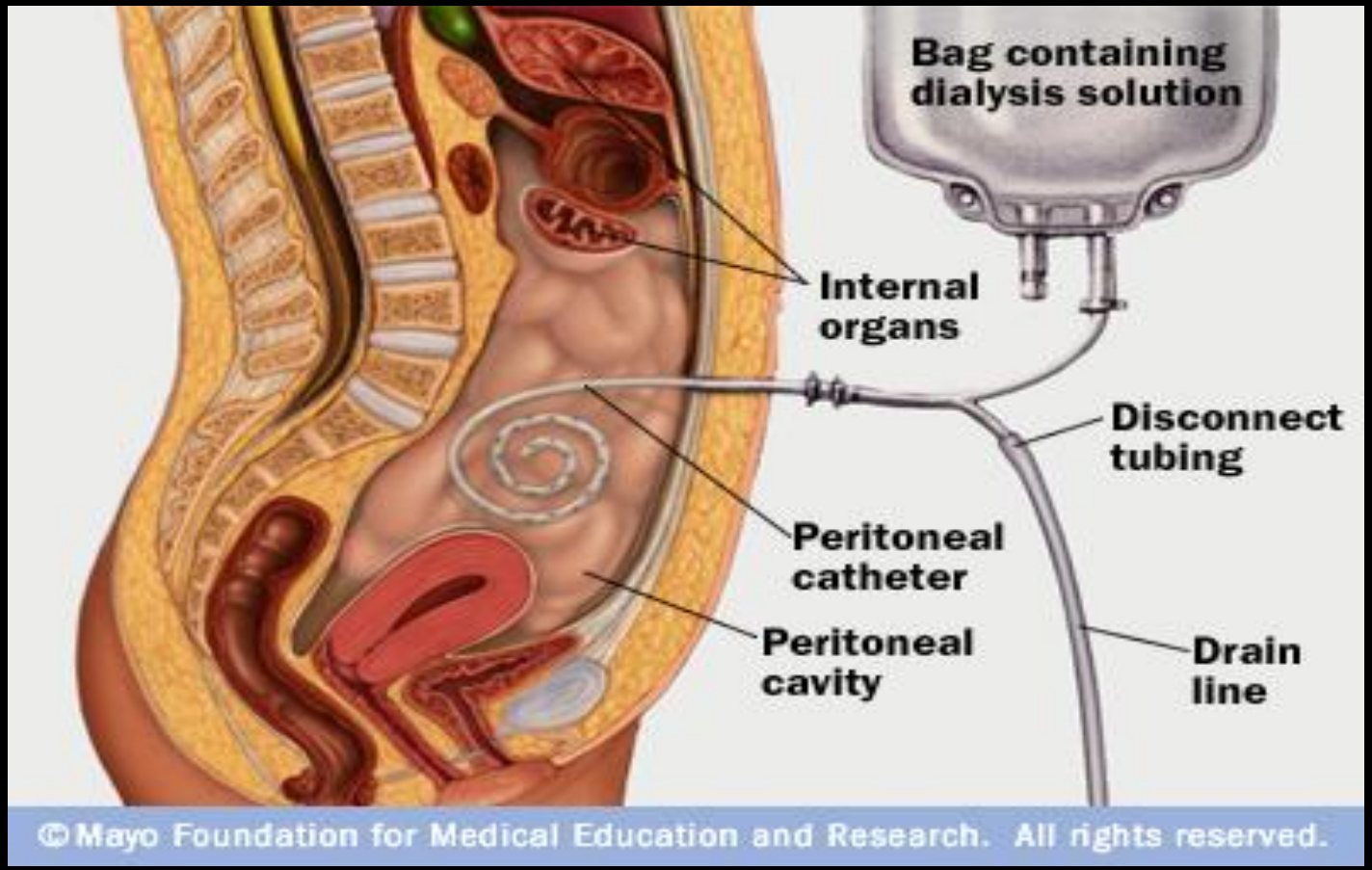
Pre -Hemodialysis

- Before getting hemodialysis treatment doctor must access the blood stream. The process is know as Vascular Access.
- There are three types of vascular access
  - The Arterio Venous (AV) fistula
  - The Arterio Venous (AV) graft
  - The central venous catheter or internal port devices.

Peritoneal dialysis

- During the process of peritoneal dialysis, a sterile solution containing glucose is run through a tube into the peritoneal cavity, located around the intestine where the peritoneal membrane acts as a semi permeable membrane.
- Helps to remove harmful fluids from the body.
- Dialysate is also used
- The peritoneal cavity is then connected to a machine called cycler
- This is process in done in the body
- Patients have to perform peritoneal dialysis in the comfort of their homes four to five days out of the week. For about 8 hour each day.

Pre- Peritoneal dialysis



Pros and Cons

- Pros:
  - It is pay for by patients private health care.
  - Keep the body clean until the kidney transplant is performed.

  Cons:

  - You don’t know when a kidney is going to come in.
  - It’s a long process to go through each day.
  - Patients have to be put on a special diet and they can not drink.

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