



CANINE PARVOVIRUS

DR. PAGE WAGES

CARE FIRST ANIMAL HOSPITAL

RALEIGH, NC



ABOUT ME

- ORIGINALLY FROM UPSTATE NY
- GRADUATED IN 2001 SLU AND IN 2005 FROM NC STATE COLLEGE OF VETERINARY MEDICINE
- ONE OF THE VETERINARIANS WITH THE TEAM AT CAREFIRST ANIMAL HOSPITAL SINCE 2005
- RECENTLY IN THE RUNNING FOR AMERICA'S FAVORITE VETERINARIAN (GOT 3RD PLACE IN 2014 AND 2015)



PARVOVIRUS TODAY: COVID??

- IN THE US...AS OF JULY 6, 2020 – THERE HAS BEEN AN INCREASE IN NUMBER OF CASES OF PARVOVIRUS BY 70% SINCE COVID
 - DECREASED NUMBER OF ROUTINE VISITS / VACCINATIONS
 - INCREASED VISITS TO DOG PARKS AND SOCIAL PLACES WITH PETS



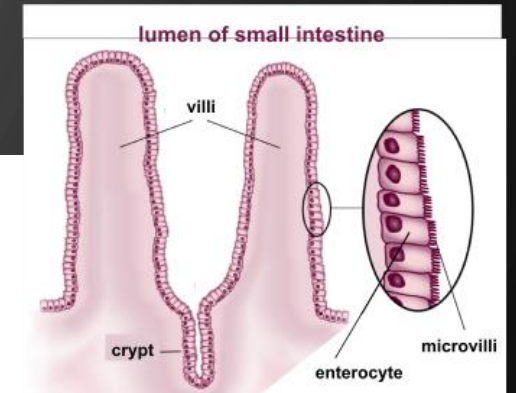
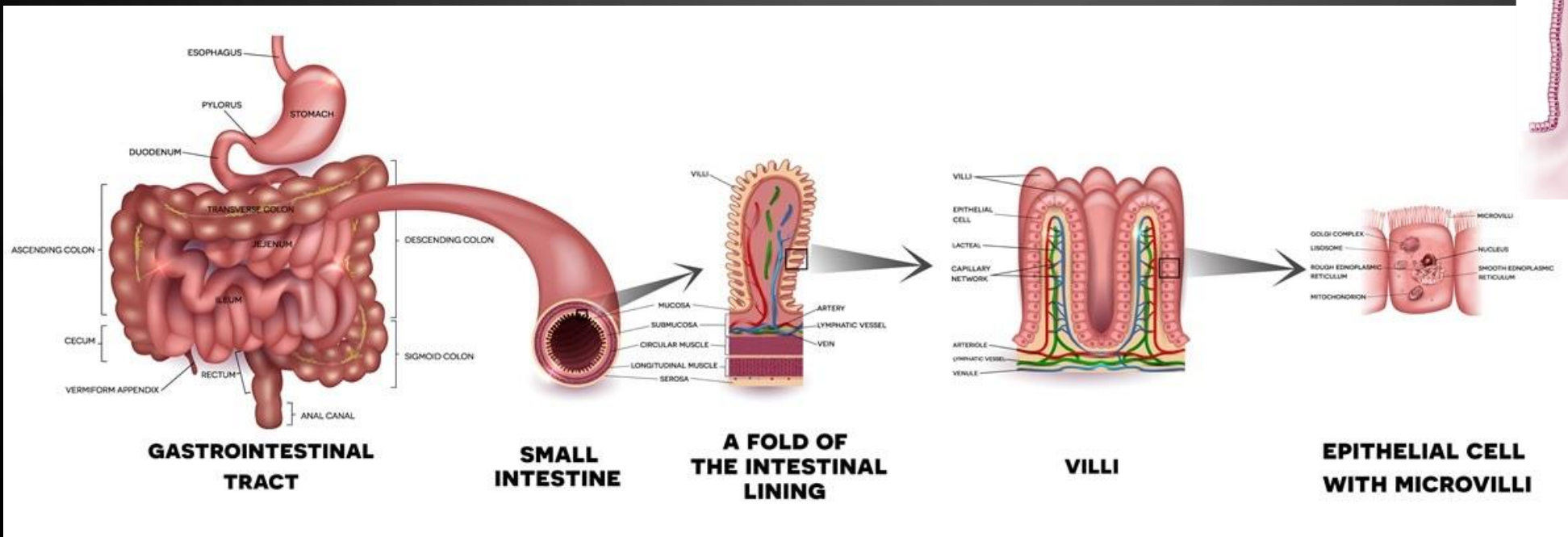
DIARRHEA!!!

THERE ARE DIFFERENT TYPES??

- OSMOTIC DIARRHEA
 - VIRAL INFECTIONS
 - NON-ABSORBED SUBSTANCES IN GUT PULL WATER IN
- SECRETORY DIARRHEA
 - BACTERIAL INFECTIONS
 - INTESTINAL MUCOSA STIMULATED TO PRODUCE/SECRETE FLUIDS FROM TOXINS
- EXUDATIVE DIARRHEA
 - VIRAL INFECTIONS
 - PARVOVIRUS
 - DAMAGE TO THE GUT LINING CAUSES A LOSS OF BLOOD/PROTEINS/FLUID INTO THE GUT
- MOTILITY-ASSOCIATED DIARRHEA
 - ABNORMAL GUT MOTILITY
 - ILEUS
 - HYPER-GUT WHICH CAUSES A DECREASED ABSORPTION

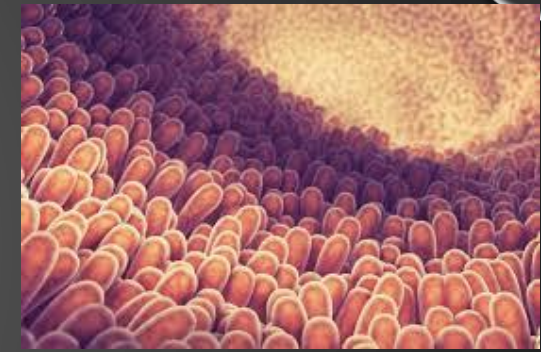


INTESTINES! LET'S REVIEW THE ANATOMY

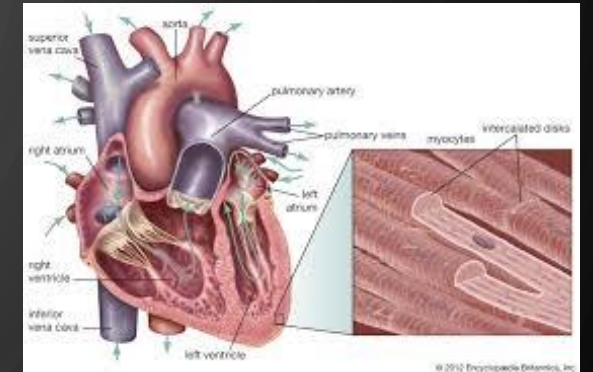


It takes 5-7 days for the villi to replenish after an insult!

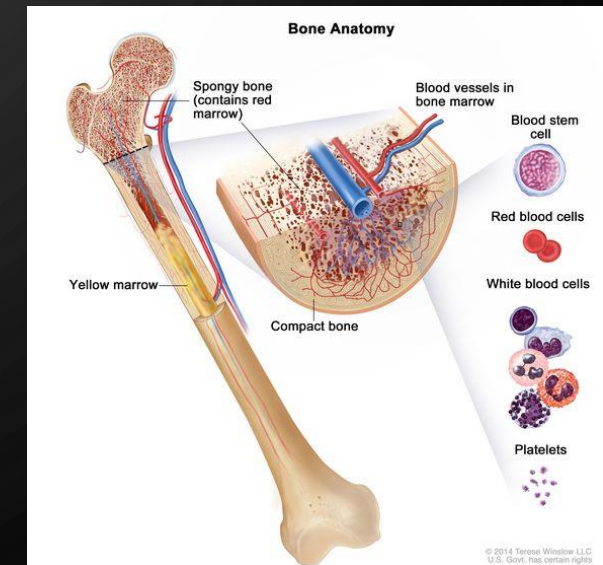
PHYSIOLOGY OF PARVOVIRUS

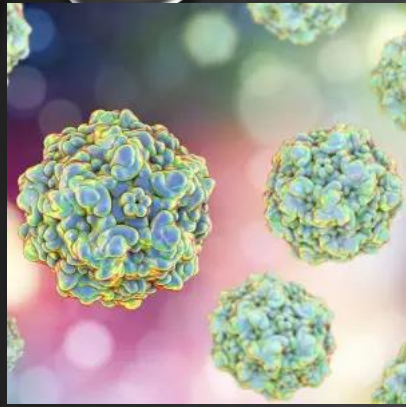


- VIRUS GETS INTO LYMPH TISSUE (FECAL/ORAL, SALIVA) → VIRUS MOVES INTO THE CIRCULATION → TRAVELS TO RAPIDLY DIVIDING CELLS AND REPLICATES THERE



- INTESTINES →. CRYPT CELLS ARE DAMAGED → MUCOSAL LOSS → VOMITING/DIARRHEA
- BONE MARROW → ANEMIA AND LEUKOPENIA
- CARDIAC MUSCLE → SUDDEN DEATH
- INFECTION TAKES 4 DAYS TO GET TO THE INTESTINES AND SYMPTOMS SHOW BY DAY 7





INFECTIOUS?



- VIRUS SURVIVES 5-7 MONTHS IN A DRY ENVIRONMENT AND UP TO A YEAR IN A MOIST ENVIRONMENT

INCREASED NUMBER OF INFECTIONS AFTER RAIN/DURING RAINY SEASON

- 1 GRAM OF INFECTED FECES CAN INFECT 10 MILLION SUSCEPTIBLE DOGS!
- A PUPPY VACCINATED UP TO 12 WEEKS IS ONLY 82% PROTECTED. THEREFORE, THEY NEED TO BE VACCINATED EVERY 4 WEEKS UNTIL 5 MONTHS OF AGE

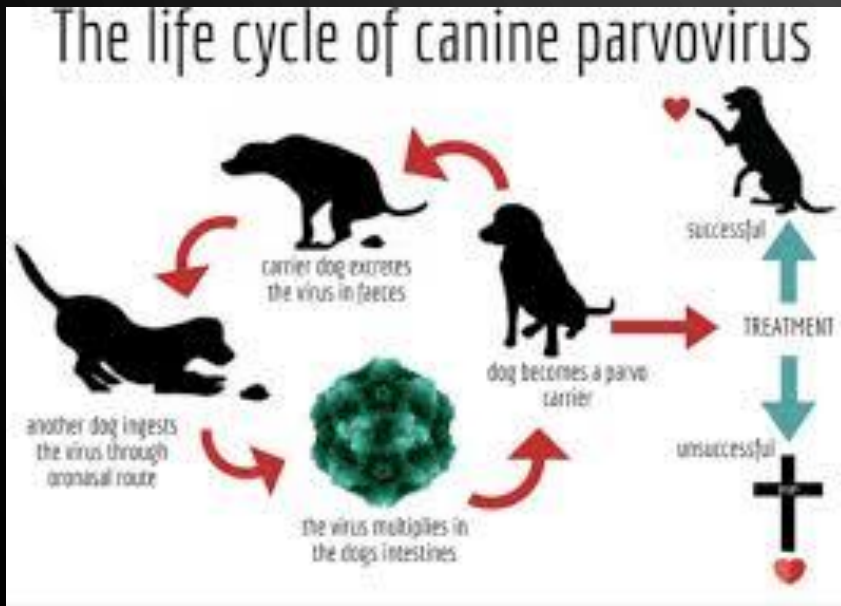
SUSCEPTIBLE?

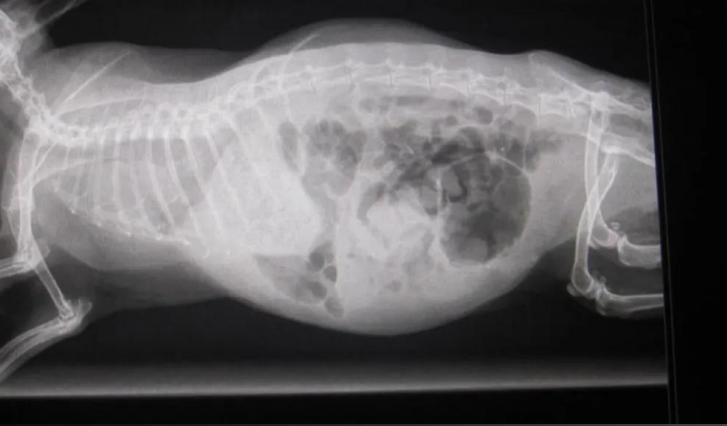
- DOGS IN SHELTERS, PET STORES, BOARDING KENNELS
- DOGS 6 WEEKS – 4 MONTHS OF AGE
- BREEDS MORE SUSCEPTIBLE:
 - ROTTWEILERS
 - DOBERMAN
 - GERMAN SHEPHERDS
 - AMERICAN PIT BULLS



PREVALENCE IN INDIA

- FIRST ISOLATED IN 1982
- A NEW STRAIN WAS FOUND IN 2001
- MORE PROMINENT IN THE NORTHERN STATES, BUT CAN BE SEEN ALL OVER INDIA
- THE INDIAN ISOLATES ARE A DIFFERENT LINEAGE THAN THE SOUTH EAST ASIAN ISOLATES





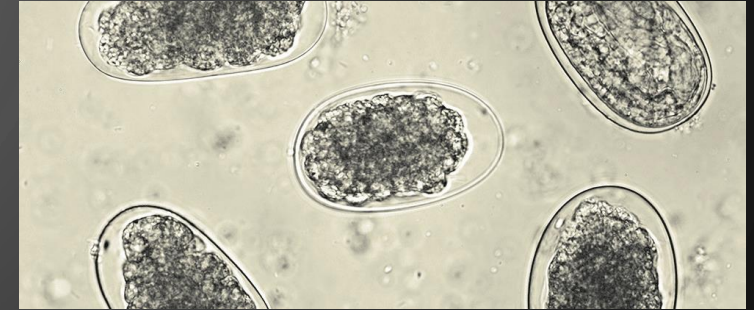
CLINICAL SIGNS

- PROFUSE WATERY DIARRHEA (EXUDATIVE DIARRHEA)
- BLOODY DIARRHEA
- VOMITING
- +/- ABDOMINAL DISCOMFORT (THIS WILL USUALLY WORSEN AS DOGS ARE REHYDRATED AND NERVE ENDINGS GET MORE ACTIVE)
- +/- FEVER
- DEHYDRATION
- +/- SHOCK / SEIZURES (FROM HYPOGLYCEMIA)
- SECONDARY INFECTIONS (SKIN, UTI, ETC)

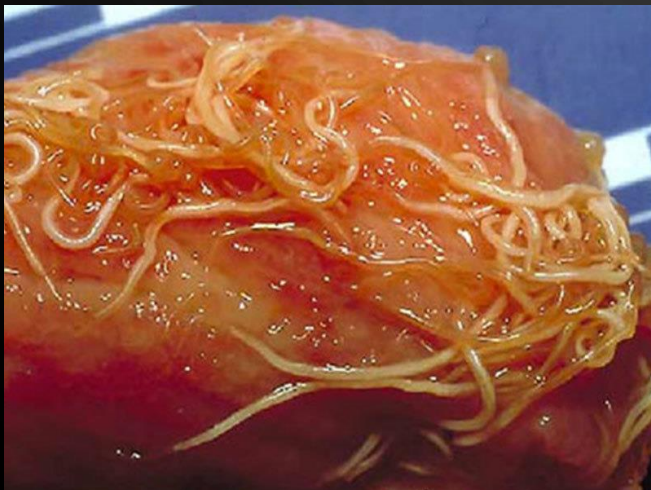


WHO LIKES TO ATTACK WITH PARVOVIRUS?

- WORMS!!!!



- IVERMECTIN – 0.1 CC/5 KG SUBCUTANEOUSLY ONCE





DIAGNOSIS



- EXAM
- STOOL CHECK (IF POSSIBLE)...OR THE “SMELL TEST”
 - SECONDARY PARASITES ARE COMMON!
- CLINICAL SIGNS
- SNAP PARVO TEST (ANTIBODY TEST) – MAY BE A FALSE NEGATIVE IN THE FIRST 3-5 DAYS OF THE DISEASE
- DECREASED WBC (LEUKOPENIA)
- BLOODWORK:
 - LOW ALBUMIN
 - LOW PLATELETS → DIC
 - LOW CHOLESTEROL/POTASSIUM/SODIUM
 - MILD ELEVATED LIVER ENZYMES AND HIGH RENAL VALUES



TREATMENT

- SUPPORTIVE CARE
- ANTIBIOTICS TO PREVENT THE SECONDARY INFECTIONS
- TREATMENT GOALS:
 - DECREASE GUT SECRETIONS
 - INCREASE ABSORPTION OF NUTRIENTS
 - NUTRITIONAL SUPPORT
 - ANTI-EMETICS – STOP THE VOMITING!





FLUIDS! FLUIDS! FLUIDS!



- GOAL IS TO BEAT THE VIRUS THROUGH A RACE AGAINST DEHYDRATION

- IV FLUIDS
- SUBCUTANEOUS FLUIDS



- FLUIDS ARE TREATING:

- 1. SHOCK – WITH A FLUIDS THAT RESEMBLES PLASMA – LACTATED RINGERS (LRS)
- 2. DEHYDRATION – WITH A FLUID THAT RESEMBLES EXTRACELLULAR FLUIDS - LRS
- 3. GUT LOSS THROUGH VOMITING AND DEHYDRATION – WITH A FLUIDS THAT RESEMBLES ELECTROLYTE LOSS THROUGH THE INTESTINES – NA₂CL OR LRS + KCL
- 4. MAINTENANCE FLUIDS – FLUIDS THAT RESEMBLE LOSS IN THE URINE AND LUNGS – 0.45% NA₂CL + 2.5% GLUCOSE + KCL

LACTATED RINGERS OR 0.9% NACL

- IV FLUIDS:
 - FLUID RATE IS THE 2 X THEIR WEIGHT IN KG
- SUBCUTANEOUS FLUIDS:
 - 100 ML PER 5 KG



Plasma??

- 5-10ml/kg
- Not readily available

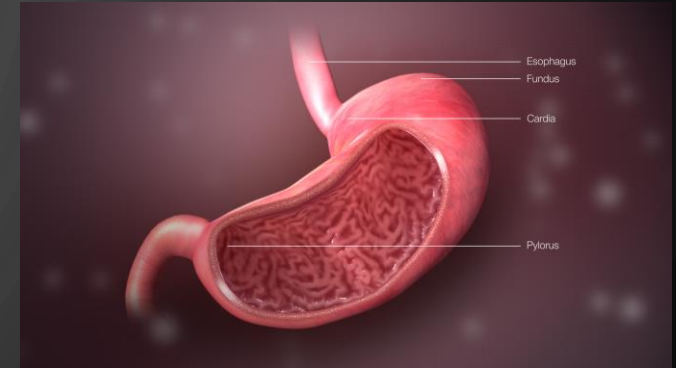
ANTI-EMETICS – STOP THE VOMITING!

1. METOCLOPRAMIDE – CAN ADD TO THE BAG OF LRS – 2 CC PER BAG
2. MAROPITANT (CERENIA) – GIVEN SQ OR IV (1 ML/11 KG)
3. ONDANSETRON – SEROTONIN INHIBITOR
4. GASTRIC TUBE / NG TUBE – REMOVE THE STOMACH FLUID





REDUCE STOMACH ACID SECRETIONS

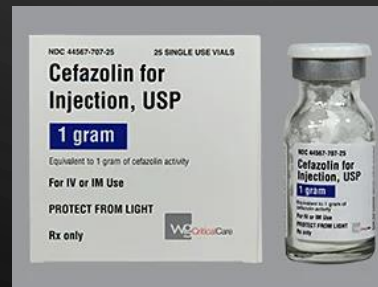


1. **FAMOTIDINE OR RANITIDINE**
 - REDUCES PANCREATIC/BILE ACID SECRETIONS
2. **OMEPRAZOLE / PANTOPRAZOLE**
 - REDUCES GASTRIC ACID SECRETIONS (BUT TAKES 2-3 DAYS FOR EFFECT)
3. **SUCRALFATE**
 - INCREASES STOMACH MUCUS PRODUCTION (GOOD IF CONCERNED ABOUT STOMACH ULCER)
4. **MISOPROSTOL**
 - INCREASES BLOOD FLOW AND STOMACH MUCUS SECRETIONS



ANTIBIOTICS – TREAT THE SECONDARY INFECTIONS

- AMOXICILLIN – 11 MG/KG PO
- PENICILLIN – 0.1 ML/KG
- METRONIDAZOLE – 15 MG/KG
- ENROFLOXACIN (BAYTRIL) – 5 MG/KG – PO OR SQ
- CEPHALOSPORINS – CAN BE USED, BUT GI UPSET IS A COMMON SIDE EFFECT IF GIVEN ORALLY
 - CEFAZOLIN – 1 CC/5 KG IV OR IM



TIME TO FEED THE GUT!

1. FAST THE GI TRACT FOR 12-24 HOURS
 - DECREASES GASTRIC ACID SECRETION → REDUCES FLUID QUANTITY IN THE GUT
2. GLUCOSE/ELECTROLYTE SOLUTION ORALLY
 - 1 BAG LRS (1000ML) + REMOVE 50 ML AND REPLACE WITH 50 ML 50% DEXTROSE
3. LIQUID BLAND DIET – SCIENCE DIET LOW FAT, ROYAL CANIN LOW FAT
4. BLAND DIET



SURVIVAL

Poor Prognostic indicators:

- Fever
- Low WBC

- 50% CASES WILL SURVIVE WITH AGGRESSIVE TREATMENT
- IF A DOG LIVES THE FIRST 4 DAYS, GREATER CHANCE OF SURVIVAL



REVIEW OF TREATMENT PLANS

IN HOSPITAL

- IV FLUIDS
- IV ANTIBIOTICS
- SQ IVERMECTIN
- ANTI-EMETICS
- TRICKLE FEEDING



IN THE FIELD

- SQ FLUIDS
- SQ ANTIBIOTICS
- SQ IVERMECTIN
- ANTI-EMETICS
- SLOWLY INTRODUCE FOOD



SEQUELA TO PARVOVIRAL INFECTIONS



- INTUSSUSCEPTION
- POLYARTHRITIS
- PHLEBITIS
- EMBOLISMS
- RENAL INFARCTIONS
- SUDDEN DEATH
- CARDIAC DISEASES (DUE TO VIRAL ATTACK OF MYOCYTES)
 - ENDOCARDITIS
 - CARDIOMYOPATHY

PARVOVIRUS IS A PREVENTABLE DISEASE!

- PREVENTION IS MUCH EASIER THAN THE TREATMENT
- PREVENTION IS MUCH CHEAPER THAN THE TREATMENT!

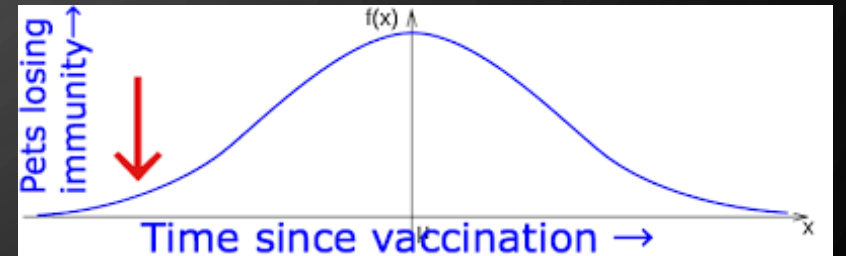
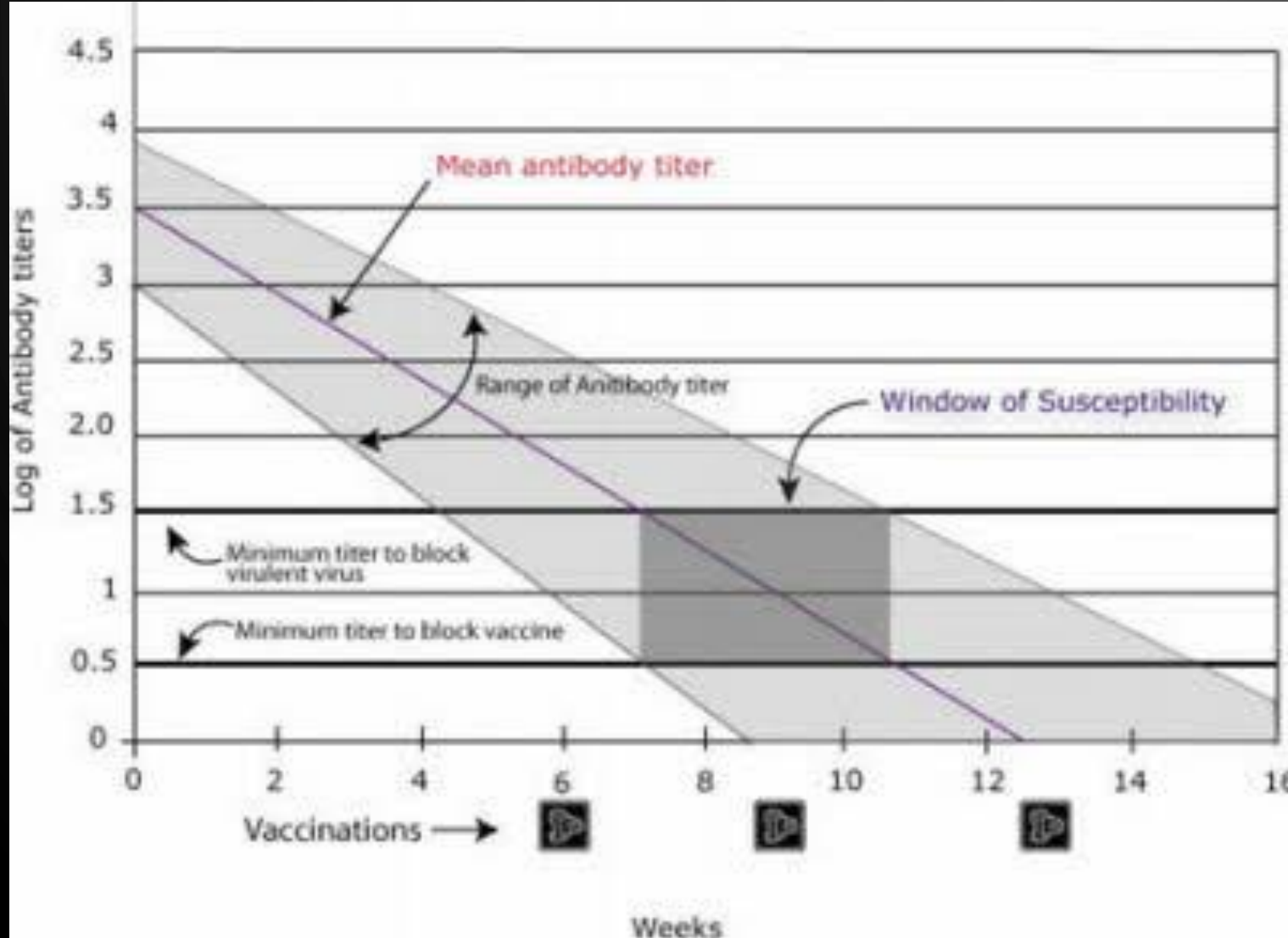


PREVENTION: VACCINE!

- VACCINATION
 - MAKE SURE MOTHER DOG IS VACCINATED PRIOR TO PREGANCY—
WILL PASS ANTIBODIES TO LITTER
 - VACCINATE
 - 8 WEEKS (60 DAYS)
 - 12 WEEKS (90 DAYS)
 - 16 WEEKS (120 DAYS)
 - 20 WEEKS
 - 1 YEAR, THEN EVERY 3 YEARS AFTER



IMMUNITY IN PUPPIES



VACCINES

- VACCINATE
 - 8 WEEKS (60 DAYS)
 - 12 WEEKS (90 DAYS) – CAN GIVE RABIES
 - 16 WEEKS (120 DAYS)
 - 20 WEEKS
 - 1 YEAR, THEN EVERY 3 YEARS AFTER

