

REPRODUCTIVE ORGANS OF FARM ANIMALS



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TERMS

■ ESTRUS

- PERIOD DURING WHICH FEMALE IS RECEPTIVE TO COURTSHIP AND COPULATION
- 24 HOUR PERIOD

■ ESTROUS

• CYCLE OF ESTRUS

- SHEEP--17 DAYS
- HOGS, CATTLE, HORSES--21 DAYS

■ GONAD

- PRIMARY SEX GLAND; OVARY OR TESTIS

■ ZYGOTE

- CELL PRODUCED BY THE UNION OF SPERM AND OVUM (EGG) AT FERTILIZATION

TERMS

■ EJACULATION

- MOVEMENT OF SPERM FROM EPIDIDYMIS THROUGH THE PENIS INTO THE FEMALE
- 10-15 MILLION SPERM

■ FERTILIZATION

- UNITING OF THE MALE AND FEMALE GERM CELLS

■ FIMBRIA

- OPENING TO THE FALLOPIAN TUBE WHICH CATCHES THE EGG AS IT LEAVES THE OVARY

■ CRYPTORCHID MALE

- MALE ANIMAL WHICH IS STERILE BECAUSE THE TESTICLES DID NOT DESCEND INTO THE SCROTUM

TERMS

■ PROGESTERONE

- HORMONE NECESSARY TO SYNCHRONIZE ESTRUS
- PREGNANCY

■ FETUS

- YOUNG ANIMAL IN THE UTERUS FROM TIME OF COMPLETE TISSUE DIFFERENTIATION UNTIL BIRTH

■ FERTILIZATION-->ZYGOTE-->FETUS-->YOUNG ANIMAL

COMPONENTS OF MALE REPRODUCTIVE TRACT

- PRIMARY SEX ORGANS--GONADS (TESTES/TESTICLES)
 - PRODUCE SPERM
- ACCESSORY SEX ORGANS
 - EPIDIDYMIS
 - VESICULAR GLANDS
 - PROSTATE
 - PRODUCE LIQUID NUTRIENT, SPERM + LIQUID-
->SPERM
- COPULATION ORGAN--PENIS

FUNCTION OF THE EPIDIDYMIS

- **TRANSPORTATION OF SPERM**
- **CONCENTRATION OF SPERM**
- **MATURATION OF SPERM**
 - **FINAL STAGE IN THE DEVELOPMENT OF GAMETES (SPERM) IN WHICH THE NORMAL NUMBER OF CHROMOSOMES IS REDUCED BY ONE-HALF**
- **STORAGE OF SPERM**

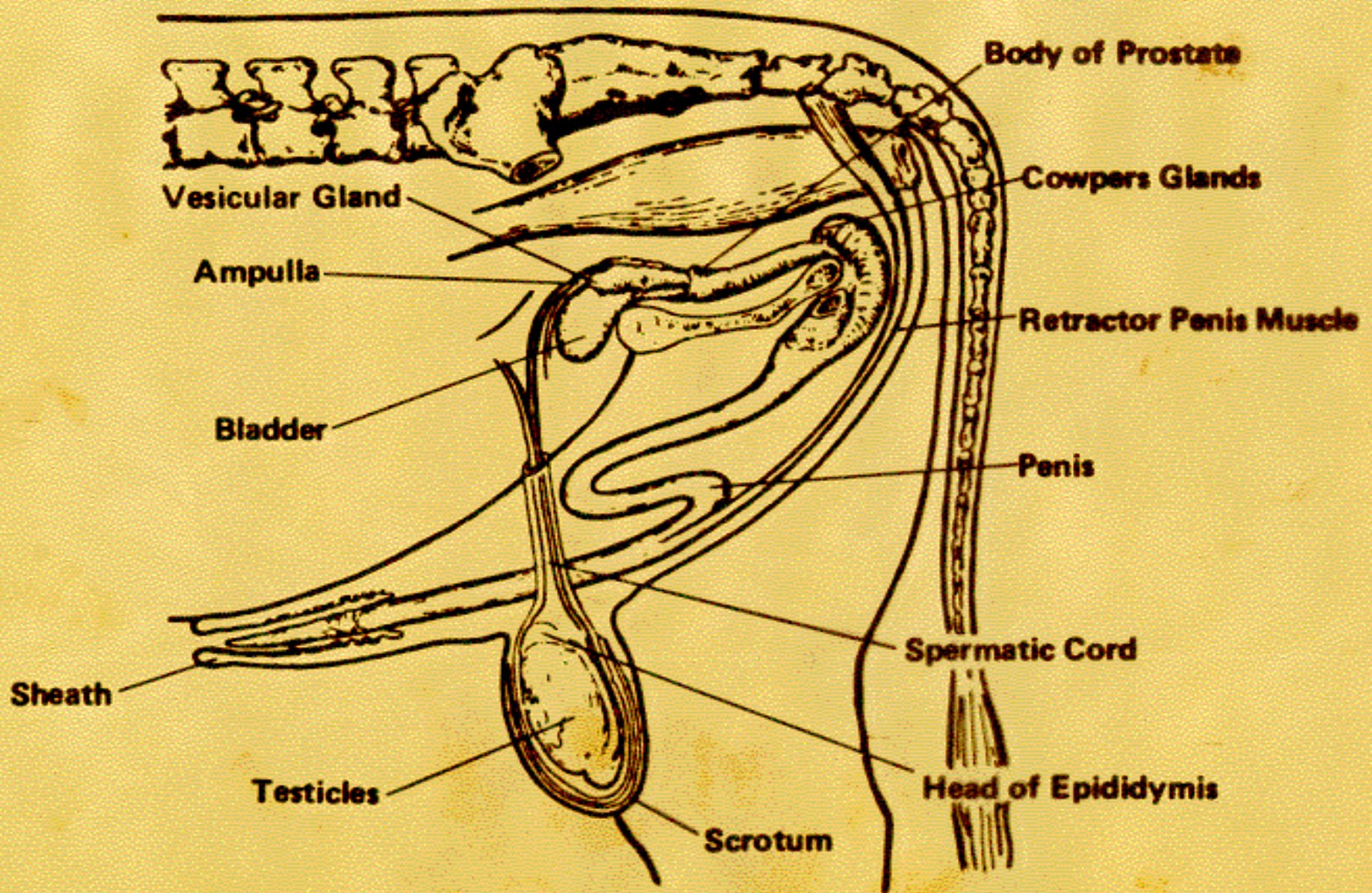
FUNCTIONS OF MALE REPRODUCTIVE ORGANS

- **TESTES--PRODUCE SPERMATOZOA, MALE GERM CELLS**
- **EPIDIDYMIS--COLLECT AND STORES THE SPERM**
- **VAS DEFERENS--TRANSPORTS SPERMATOZOA; SERVES AS STORAGE PLACE FOR SPERMATOZOA UNTIL EJACULATION**
- **AMPULLA--PRODUCES FRUCTOSE AND CITRIC ACID**
- **PENIS--TRANSPORTS SPERM FROM THE MALE TO THE FEMALE**
- **URETHRA--TRANSPORT URINE**
- **COWPERS GLAND--SECRETES AN ALKALINE MATERIAL WHICH SERVES TO CLEAN THE URETHRA PRIOR TO EJACULATION; PRODUCE A LUBRICATING SUBSTANCE**

FUNCTIONS OF MALE REPRODUCTIVE ORGANS

- **PROSTATE GLAND--SECRETES A HIGH MINERAL COMPOSITION THAT BECOMES A PART OF THE SEMEN**
- **SEMINAR VESICLE--SECRETES A SUBSTANCE HIGH IN SIMPLE SUGAR (FRUCTOSE) WHICH SERVES AS A NUTRIENT FOR SPERMATOZOA TRANSPORT**
- **RETRACTOR PENIS MUSCLE--EXTENDS AND RETRACTS THE PENIS DURING COPULATION**
- **SCROTUM--MAINTAIN THE TEMPERATURE OF THE TESTES; SERVES AS PROTECTION FOR THE TESTES**
- **SHEATH--PRODUCE OPENING TO THE MALE REPRODUCTIVE TRACT**
- **SPERMATIC CORD--SUPPORTS THE TESTES**

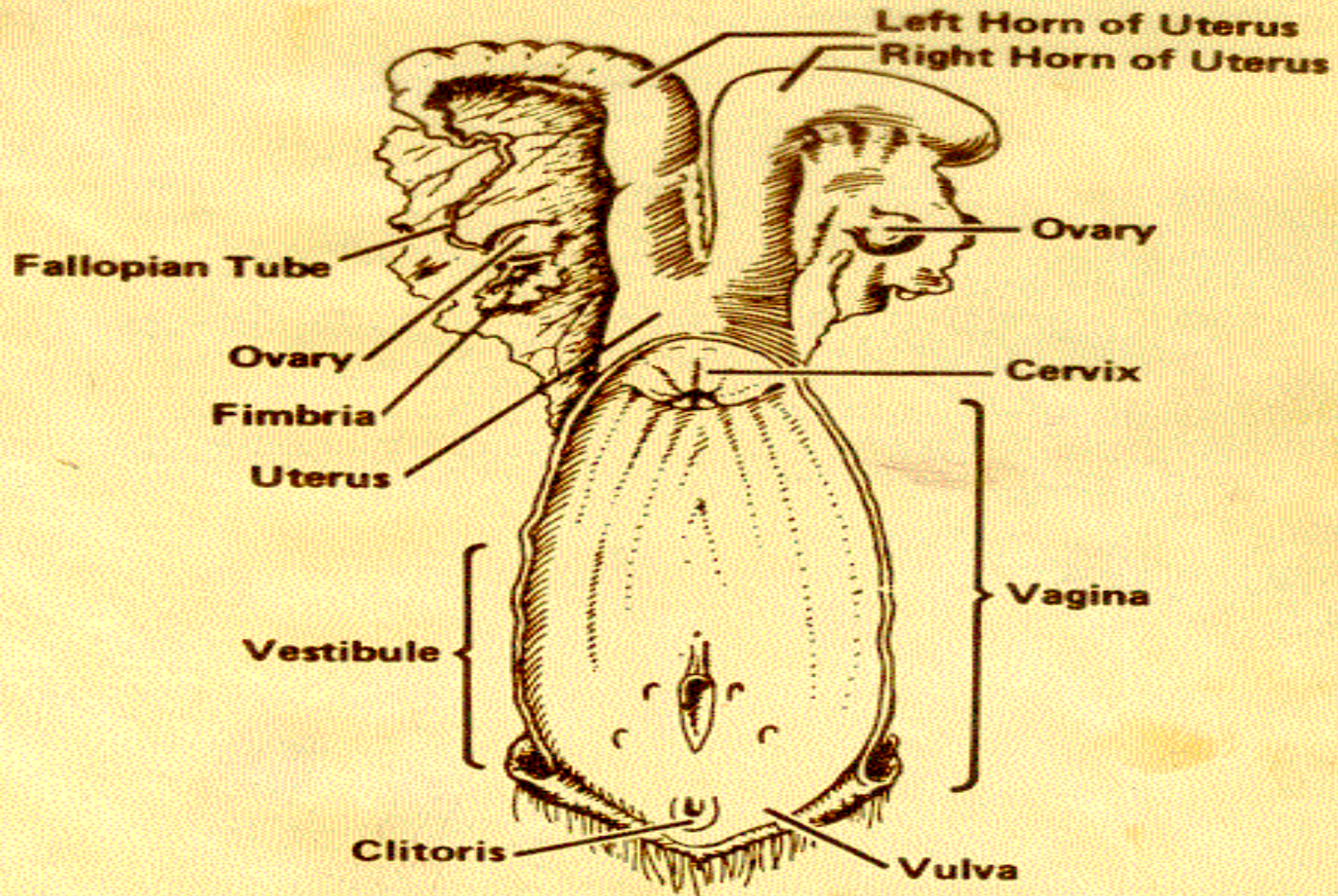
Reproductive Tract of a Bull



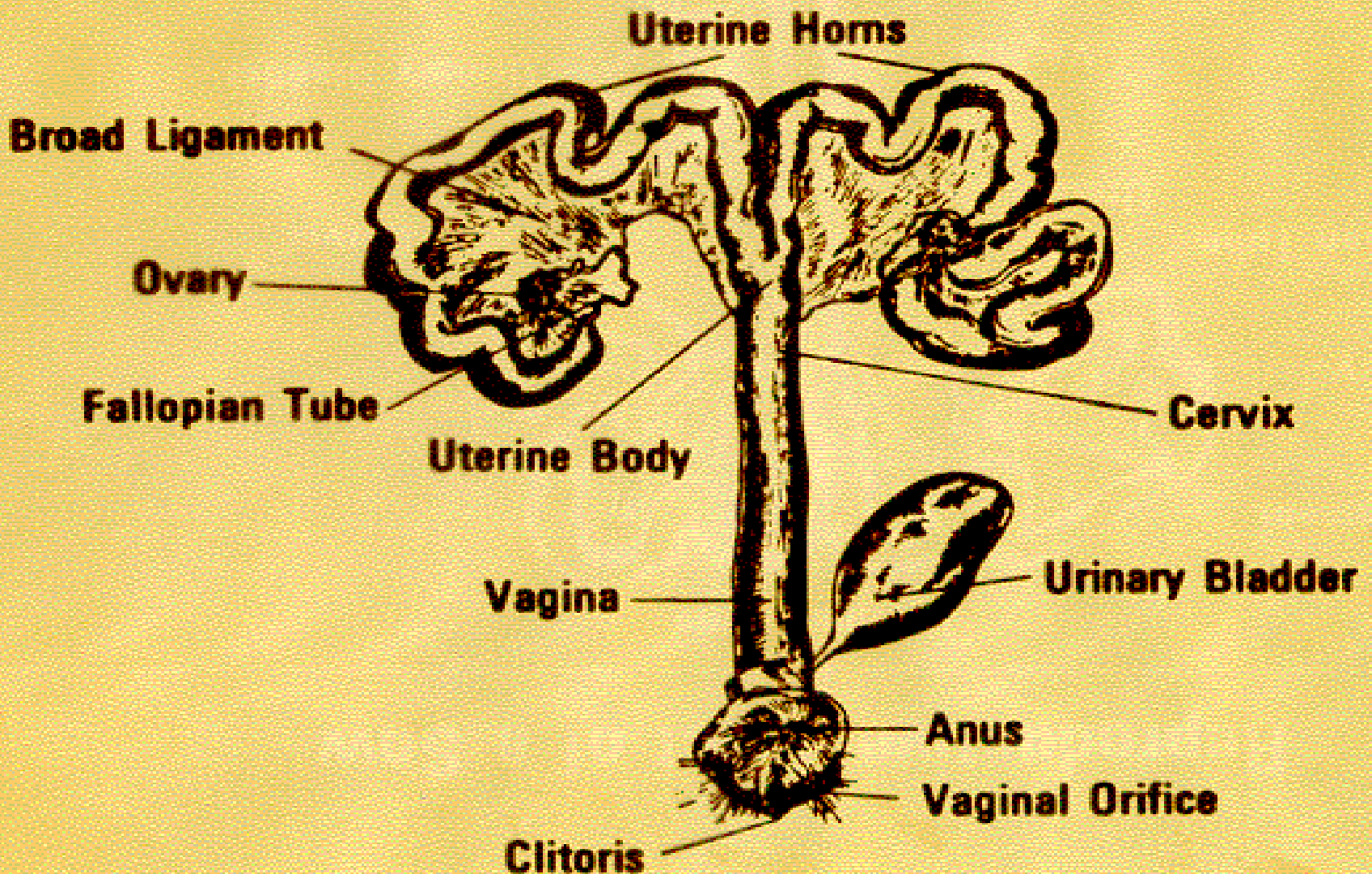
FUNCTIONS OF PARTS OF FEMALE REPRODUCTIVE TRACT

- VULVA--SERVES AS OPENING OF THE FEMALE REPRODUCTIVE TRACT
- CLITORIS--INCREASE SEXUAL EXCITEMENT OF FEMALE DURING COPULATION
- VAGINA--SERVES AS CHANNEL FOR BIRTH OF FETUS; RECEIVES MALE PENIS DURING COPULATION
- CERVIX--SERVES AS A DIVIDER BETWEEN THE VAGINAL AND THE UTERUS; SECRETES A FLUID OR MUCUS THAT FORMS A PLUG AT END OF CERVIX INSIDE THE UTERUS WHEN PREGNANCY OCCURS.
- UTERUS--PROVIDES PLACE FOR FETAL DEVELOPMENT AT ALTER STAGES OF PREGNANCY
- HORNS OF UTERUS--SERVES AS PLACE FOR EMBRYO TO DEVELOP INTO A FETUS
- FALLOPIAN TUBE--SERVES AS PLACE WHERE FERTILIZATION OCCURS
- OVARIES PRODUCE EGGS, THE FEMALE GERM CELLS

Reproductive Tract of a Cow



Reproductive Tract of a Sow



FUNCTION OF OVARY

- **PRODUCES THE EGG**
- **PRODUCES HORMONE ESTROGEN**
 - **HIGHER LEVELS OF ESTROGEN IN BLOODSTREAM BRING COW IN HEAT**
- **MOVES SPERM THROUGH THE REPRODUCTIVE TRACT**
- **BUILDS NEST FOR EMBRYO**
- **PRODUCES HORMONES PROGESTERONE**
 - **TAKES COWS OUT OF HEAT**

FUNCTIONS OF MUCOUS FLUID

- **SERVES AS CLEANSING AGENT**
- **SERVES AS STREAM FOR PASSAGE OF SPERM**

HORMONES PRODUCED BY OVARIES

- ESTROGEN
 - INCREASE OF ESTROGEN CAUSES THE NERVOUS SYSTEM TO PRODUCE BEHAVIORAL ESTRU
- PROGESTERONE
 - WHEN OVULATION IS COMPLETED, THE CORPUS LUTEM IS FORMED AND BEGINS TO SECRETE PROGESTERONE TO TAKE THE ANIMAL OUT OF HEAT

PRIMARY ORGANS OF REPRODUCTION

- MALE--TESTES
- FEMALE--OVARIES

ARTIFICIAL INSEMINATION TERMS

- ARTIFICIAL INSEMINATION--MEANS OF OBTAINING PREGNANCY WITHOUT THE USE OF A NATURAL SERVICE
- PREGNANCY--TERM USED TO INDICATE THAT AN ANIMAL IS CARRYING A YOUNG FETUS
- FERTILIZATION--UNITING OF THE FEMALE AND MALE GERM CELLS
- GESTATION--LENGTH OF TIME FROM FERTILIZATION UNTIL BIRTH
 - SWINE--114 DAYS
 - BEEF--280-283
 - HORSES--336
 - SHEEP--150 DAYS

ARTIFICIAL INSEMINATION TERMS

- CONCEPTION--FEMALE AND MALE GERM CELLS MEETING AND FERTILIZATION OCCURRING WITHOUT FUTURE HEAT CYCLE
- ESTRUS CYCLE--TIME ELAPSING FROM ONE HEAT PERIOD TO THE NEXT
- INSEMINATING TUBE--TUBE USED TO PLACE SPERM INTO A FEMALE'S REPRODUCTIVE TRACT
- HORMONE--INTERNAL BODY SECRETION THAT AIDS IN REPRODUCTION

ADVANTAGE OF USING A.I

- IMPROVEMENT OF HERD
- WIDER SELECTION OF SIRES
- PREVENTION OF DISEASE SPREAD
- INCREASE IN OFFSPRING UNIFORMITY
- REDUCE COST OF KEEPING SIRE
- SAFETY

DISADVANTAGE OF USING A.I,

- SKILLED TECHNICIAN REQUIRED
- CLOSER SUPERVISION OF FEMALE REQUIRED
 - CATTLE SUPERVISED 2-3 TIMES PER DAY TO DETECT HEAT
- EQUIPMENT NEEDED

SOURCES OF SEMEN FOR A.I.

- STUDS
- COLLECTION OWN SIRE
- BUYING DIRECT FROM BREEDER

CHARACTERISTICS OF SEMEN

- DURING EJACULATION
 - COLOR--WHITE TO CREAM WITH VARIATION FROM CLEAR TO YELLOW
 - VOLUME--FROM 2-6 CUBIC CENTIMETERS
 - pH--Range 6.5-6.9
 - SPERM CELL CONCENTRATION
 - VARIES ACCORDING TO AGE, SEASON OF THE YEAR, CONDITION OF ANIMAL
 - SPERMATOZA--PRODUCE BY TESTES

FACTORS THAT INFLUENCE VOLUME OF SEMEN PRODUCED

- AGE
- SIZE
- HEALTH
- FREQUENCY OF COLLECTION

SEMINAL FLUID PURPOSE

- CARRIER OF SPERM
- FLUSH URETHRAL CANAL OF PENIS
- BUFFER OF SPERM FROM TEMP AND INJURY
- ACTIVATES SPERMS
- METABOLIC ACTIVITY OF SPERM

PARTS OF SPERM CELL

■ HEAD

- CHROMOSOMES AND ENZYME TO BREAK DOWN THE WALL

■ NECK

- CONNECT BODY TO HEAD

■ MIDDLE PIECE

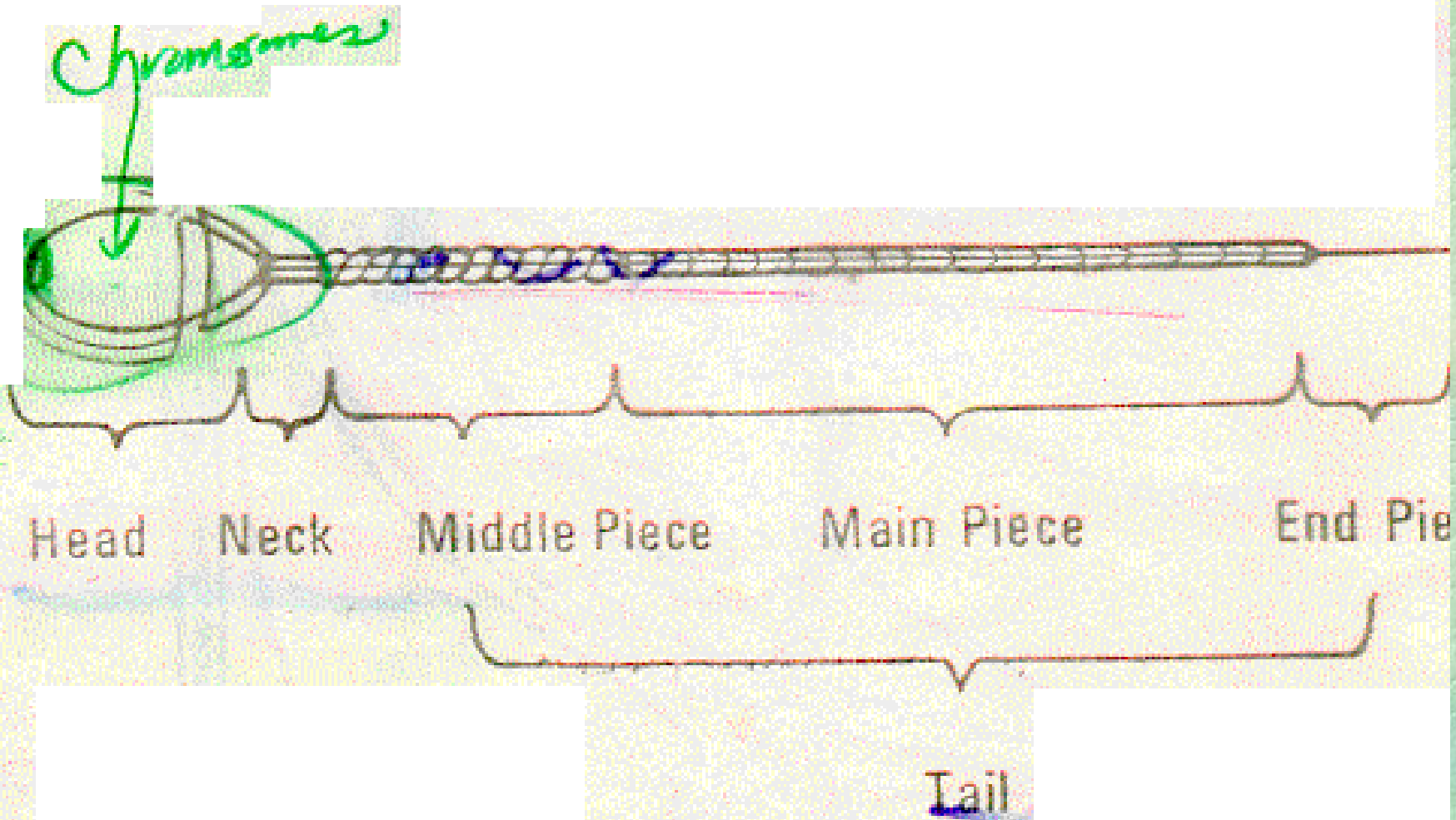
- STORE HOUSE FOR ENERGY

■ TAIL

- PROPEL THE SPERM

■ 10-15 MILLION NEEDED FOR CONCEPTION

Parts of Sperm Cell



TYPES OF ABNORMAL SPERM

- TAILLESS HEAD
- TWO HEAD
- TWO TAILS
- PEAR-SHAPED HEAD

SIGN OF ESTRUS

- STANDING TO BE RIDDEN
- RIDING OTHERS
- NERVOUSNESS, RESTLESSNESS
- CLEAR STICKY MUCUS FLOWING FROM THE VULVA
- MINOR INDICATIONS
 - DIRT OR MUD ON FLANKS ON BACK
 - HAIR STANDING UP ON TAIL HEAD
 - BELLOWING
 - HOLDING UP MILK

ESTRUS

- MOST IMPORTANT INDICATION OF ESTRUS
 - STANDING TO BE RIDDEN

NORMAL ESTRUS CYCLES FOR COWS, MARES AND SOWS

- COWS--18-24 DAYS

- DURATION OF ESTRUS STANDING HEAT IS 16-18 HOURS BUT MAY VARY FROM 6 TO 35 HOURS. THE FIRST ESTRUS AFTER CALVING WILL VARY FROM 45 TO 60 DAYS DEPENDING ON AGE AND NUTRITIONAL LEVEL OF COWS

- SOW--19-23 DAYS

- MARE--16 TO 24 DAYS

OVULATION OF A COW

- OCCURS 8 TO 10 HOURS AFTER STANDING HEAT
- IF A COW IS NOTICED IN STANDING HEAT DURING THE MORNING, SHE SHOULD BE INSEMINATED IN THE AFTERNOON.

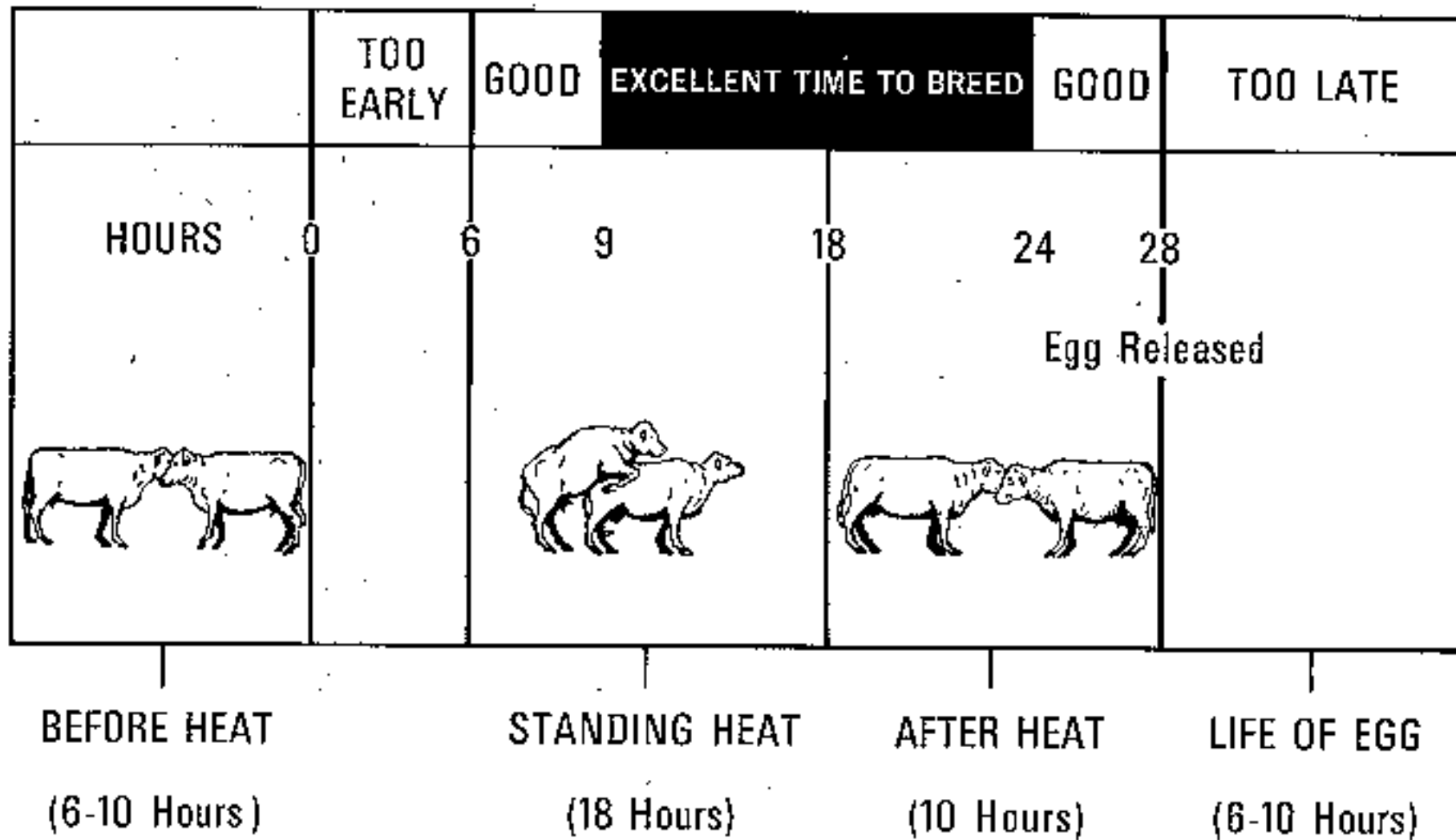
FACTORS THAT CONTRIBUTE TO POOR CONCEPTION RATE

- IMPROPER TIMING
- DISEASE
 - BANGS, LEPTO, VIBRIOSIS, VAGINITIS
- POOR INSEMINATION TECHNIQUE
- MANAGEMENT FAILURE
- OVULATION FAILURE

REASON WHY TIMING IS IMPORTANT

- SPERM MUST BE IN THE FALLOPIAN TUBE SIX HOURS BEFORE OVULATION OCCURS
 - SPERM TOO EARLY, SPERM DIES; IF DONE TOO LATE, THE EGG IS GONE
- CERVICAL REACTION OR UTERINE CONTRACTION MUST BE PRESENT

Indications of Estrus



GESTATION PERIODS

- COWS--283 DAYS
- MARE--336 DAYS
- SOW--114 DAYS
- EWE--150 DAYS

PERCENTAGE OF PREGNANCIES EXPECTED

- FIRST SERVICE 65--70%
- SECOND SERVICE 70--85%
- THIRD SERVICE 85% TO 95%

REASONS CATTLE DO NOT SETTLE

- OVULATION FAILURE
- DELAYED OVULATION
- FAILURE OF FOLLICLE TO RUPTURE
- STIMULANT NOT MOVING SPERM

METHOD OF THAWING SPERM

■ STRAW

- HOT BATH--PLACE IN WATER BATH AT 90 TO 95 DEGREE FOR ONE MINUTE
- ICE BATH--PLACE IN WATER BATH AT 37 F FOR 8-10 MINUTE
- NO THAW--TAKE STRAIGHT FROM NITROGEN TANK WITHOUT THAWING AND INSEMINATE

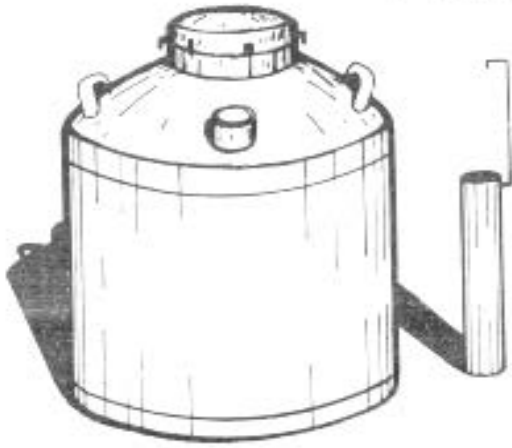
■ AMPULES

- NOT USED ANY MORE

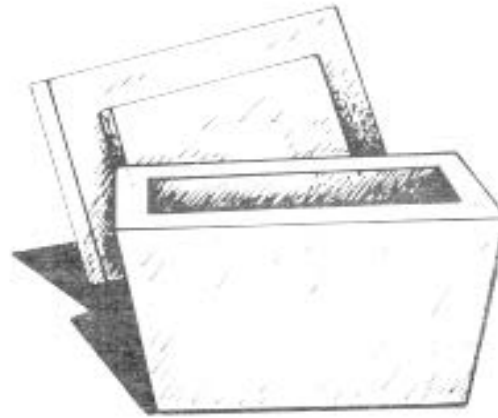
EQUIPMENT USED IN A.I.

- NITROGEN CHEST
- THAW BOX
- INSEMINATING TUBE
- DISPOSABLE GLOVES
- POLYBULB
- STRAW CLIPPERS
- STRAW

Tools Used in Inseminating



Nitrogen Chest



Thaw Box



Ampule



Straw Clippers



Straw



Inseminating Tubes



Disposable Gloves



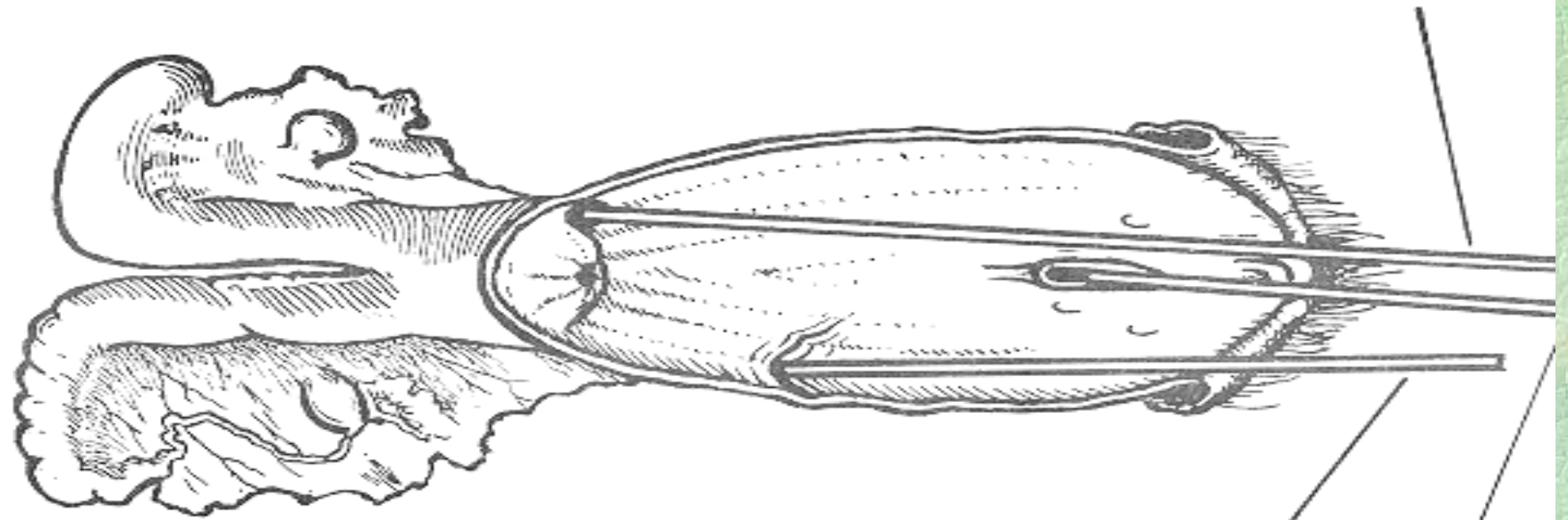
Polybulb

ERRORS IN PLACING INSEMINATING TUBE

- TUBE PLACED IN BLIND CAVITY OF CERVIX
- TUBE PLACED IN URETHRA
- TUBE IN FOLD OF VAGINAL WALL
- TUBE PLACED IN PROLAPSED CERVIX

Errors in Placing Inseminating Tube

Tube Placed in Blind Cavity of Cervix



Tube Placed in Fold of Vaginal Wall

Tube Placed in Urethra

ESTRUS AND ESTROUS CYCLE

- IMPORTANT PART OF A.I.
- MUST BE ABLE TO DETECTED WHEN THE ANIMALS IN HEAT

ESTRUS--HEAT

- OCCURS WITH THE DEVELOPMENT OF OVARIAN FOLLICLES WHICH IS BROUGHT ABOUT BY HORMONE ESTROGEN
- AVERAGE OVUM (EGG) DEVELOPS 18-24 DAYS-- AVERAGES 21 DAYS
- EVERY 21 DAYS AN EGG IS DEVELOPED AND RELEASED, UNTIL EGG IS FERTILIZED.
- AFTER FERTILIZATION, CORPUS LUTEUM (YELLOW BODY) APPEARS FORMED ON THE OVARY
- CORPUS LUTEUM--STOPS CYCLE OR EGG DEVELOPMENT AND HEAT UNTIL PARTURITION (BIRTH)

CAUSES OF COW HAVING ABNORMAL HEAT CYCLE

- RETAINED YELLOW BODY--FAIL TO REGRESS
- LOW NUTRITION--LOW ENERGY
- SILENT HEAT
- IRREGULAR HEAT CYCLE--HORMONE ABNORMALITIES

3 C OF GOOD CONCEPTION

■ CALENDAR

- COW MUST BE FRESH AT LEAST 60 DAYS
- ESTRUS CYCLE 18-24 DAYS
- CYCLE SHOULD BE CONSISTENT WITH NO MORE THAN ONE DAY DIFFERENCE

■ COW

- WATCH COWS 4 X A DAY
- (EARLY MORNING, LATE MORNING, EARLY AFTERNOON, LATE AFTERNOON)
- SPEND 15 MINUTES EACH TIME
- TREAT COWS AS AN INDIVIDUALS, NOT AVERAGE

■ CLOCK

- STANDING HEAT 12-18 HOURS
- OVULATION--RELEASING OF EGG--12-15 HOURS AFTER STANDING HEAT
- BEST INSEMINATED--LAST FEW HOURS AFTER STANDING HEAT 6-12 HOURS

PHYSICAL SIGNS TO LOOK FOR-- ESTRUS

- INCREASE PHYSICAL ACTIVITY OF THE COW
- MUCUS DISCHARGE
- SWELLING AND INFLAMMATION OF VULVA
- RIDING OTHERS OR BEING RIDDEN
- LOSS OF MILK PRODUCTION
- BAULING AND NERVOUS
- ANYTHING NOT NORMAL FOR THE COW.

ESTROUS AND HORMONES OF REPRODUCTION

- ALL FUNCTIONS OF BODY IS CONTROLLED BY HORMONES
- PRODUCED BY A SYSTEM OF ENDOCRINE GLAND
- PITUARY GLAND--"MASTER GLAND"
 - CONTROLS ALL BODY FUNCTIONS
 - DIVIDED INTO A FRONT LOBE (ANTERIOR)
 - CONTROLS REPRODUCTION
 - AND BACK LOBE (POSTERIOR)

ESTROUS CYCLE

- ESTRUS (HEAT)--TIME OF ACCEPTANCE
- PROESTRUS--PRECEDING HEAT
- DIESTRUS--HORMONE CHANGES ARE TAKING PLACE
- ANESTRUS--ABSENCE OF HEAT
- METESTRUS--MIDDLE OF CYCLE, NOTHING GOING ON
- HORMONE CYCLE
 - COW BORN 200,000 OVA (EGGS) SURROUNDED BY FOLLICLES IN 2 OVARIES

PENDULUM CYCLE

- STEP 1 PITURARY GLAND PRODUCES FOLLICLE STIMULATING HORMONE (FSH)
 - TARGET--OVARIES
 - FUNCTION--STIMULATES FOLLICLE DEVELOPMENT, AFFECTS CYCLE, CAUSES SOME TO CHANGE FASTER AND DEVELOP ESTROGEN

STEP 2--ESTROGEN HEAT

- -CAUSES HEAT
- TARGET--UTERUS, CERVIX, VULVA, VAGINA
- FUNCTION--DEPRESS FSH
 - FSH + ESTROGEN + HEAT
- AFFECTS UTERUS TO INCREASE MUSCLE TONE
- FORCE OUT ABNORMAL CONTENTS
- INCREASE BLOOD TO UTERUS AND OVARIES
 - VULVA--INCREASE CIRCULATING AND SWELLING
- CERVIX AND VAGINAL--PRODUCE MUCUS
- BRAIN CAUSES ANIMAL TO THINK AND ACT IN HEAT.

STEP 3--PITUITARY LUTINIZING HORMONE (PLM)

- PITUARY RELEASE IT TO DEPRESS ESTROGEN
- TARGET--OVARIES
 - OVARIES PRODUCE A LARGE FOLLICLE (BLISTER) THAT CONTAINS AN EGG AND PUTS THE EGG TOWARD THE FIMBRIA
- PLH + ESTROGEN IS EQUAL--FOLLICLE RUPTURES RELEASING THE EGG (OVULATION)

PROGESTREONE

- FOLLICLE FILLS WITH BLOOD AND FIBER PRODUCING THE CORPUS LUTEUM
- CORPUS LUTEM PRODUCES PROGESTRONE
- PROGESTRONE ACTS ON UTERUS TO PREPARE FOR FERTILIZED EGG
- ACTS ON PITUITARY TO DEPRESS PLH
- PROGESTRONE IS RELEASE AS LONG AS ANIMAL IS PREGNANT
- IF NOT PREGNANT CYCLE STARTS UP AGAIN

