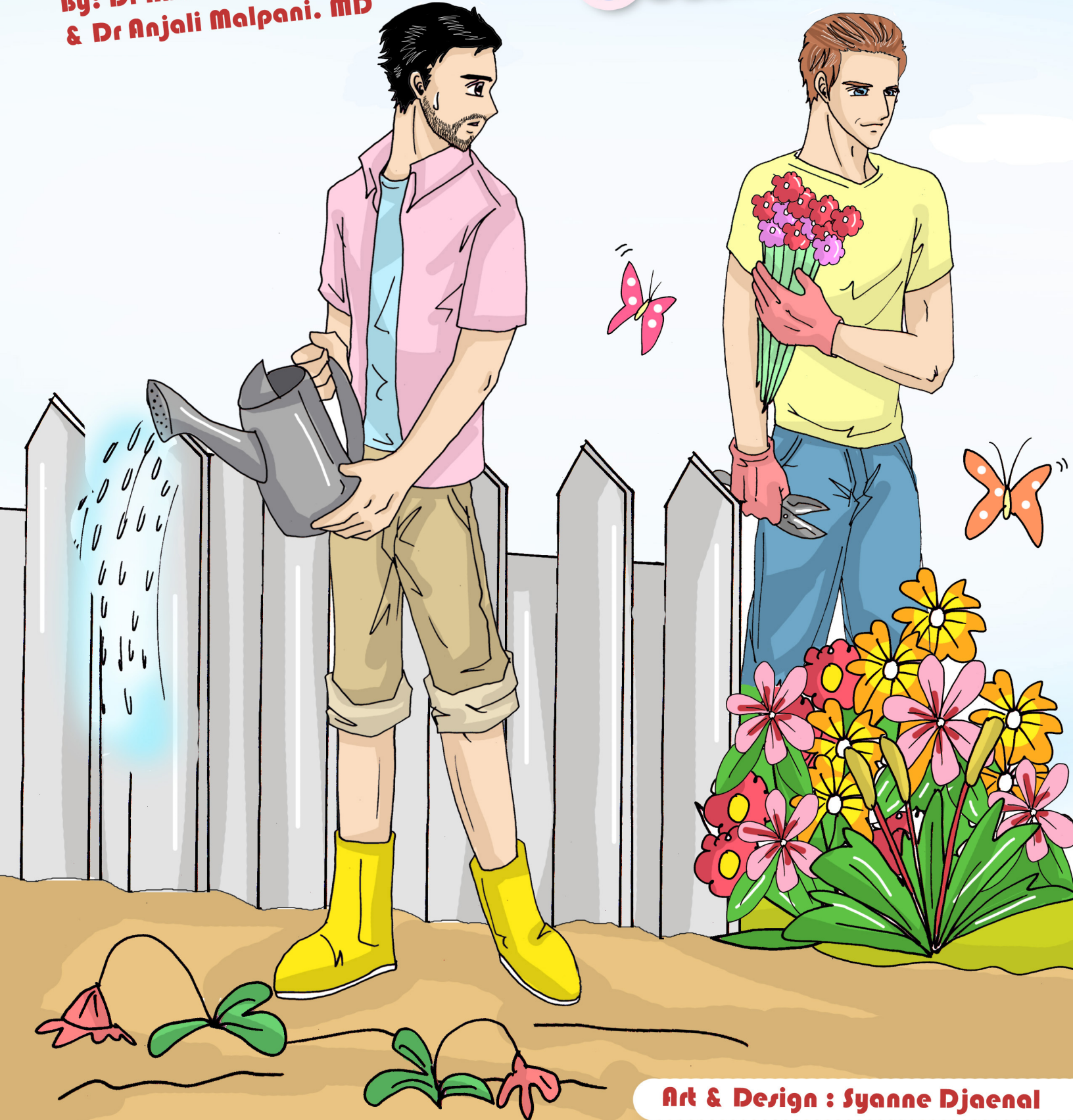


The infertile man

Comic Book

By: Dr Aniruddha Malpani. MD
& Dr Anjali Malpani. MD



Art & Design : Syanne Djaenal

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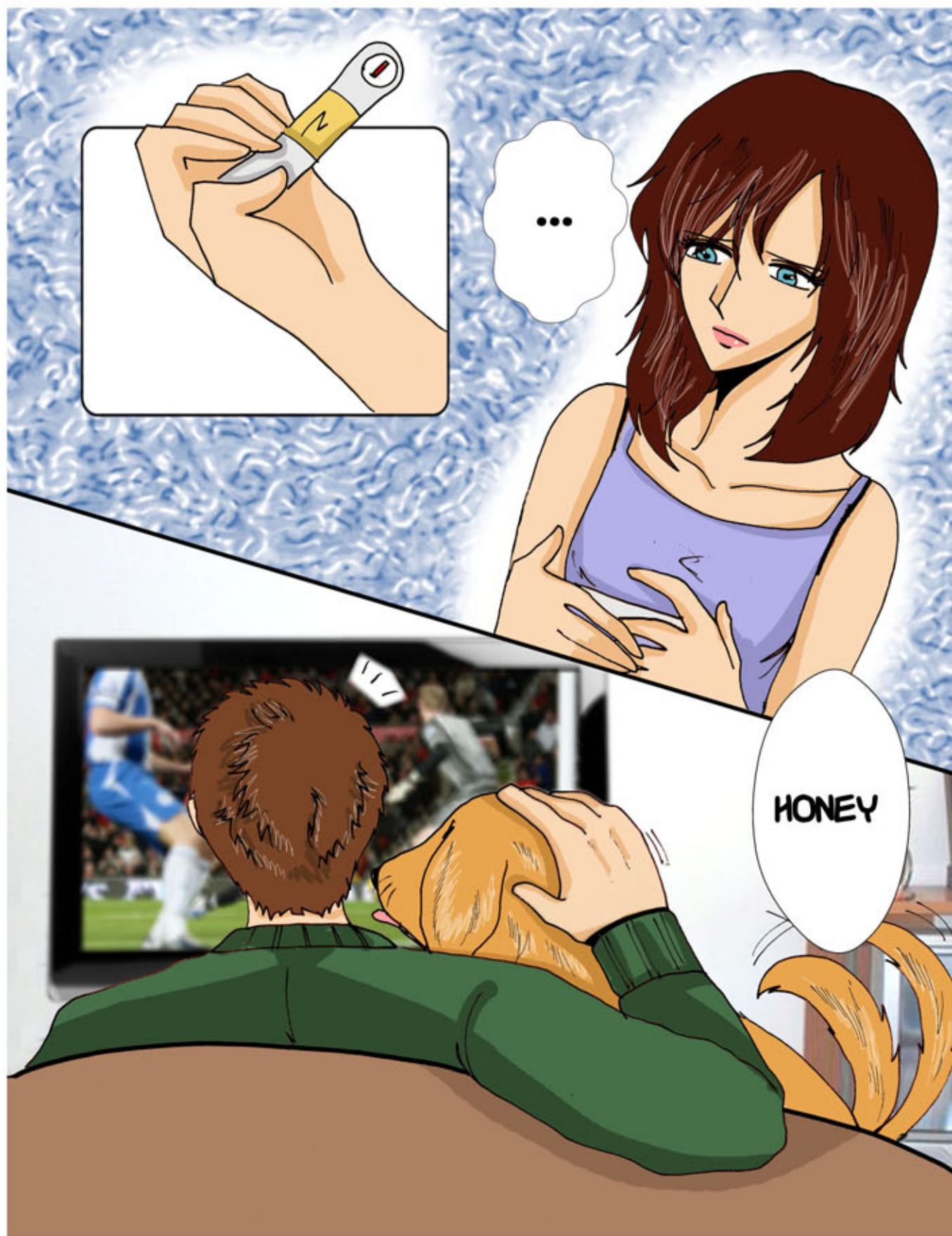
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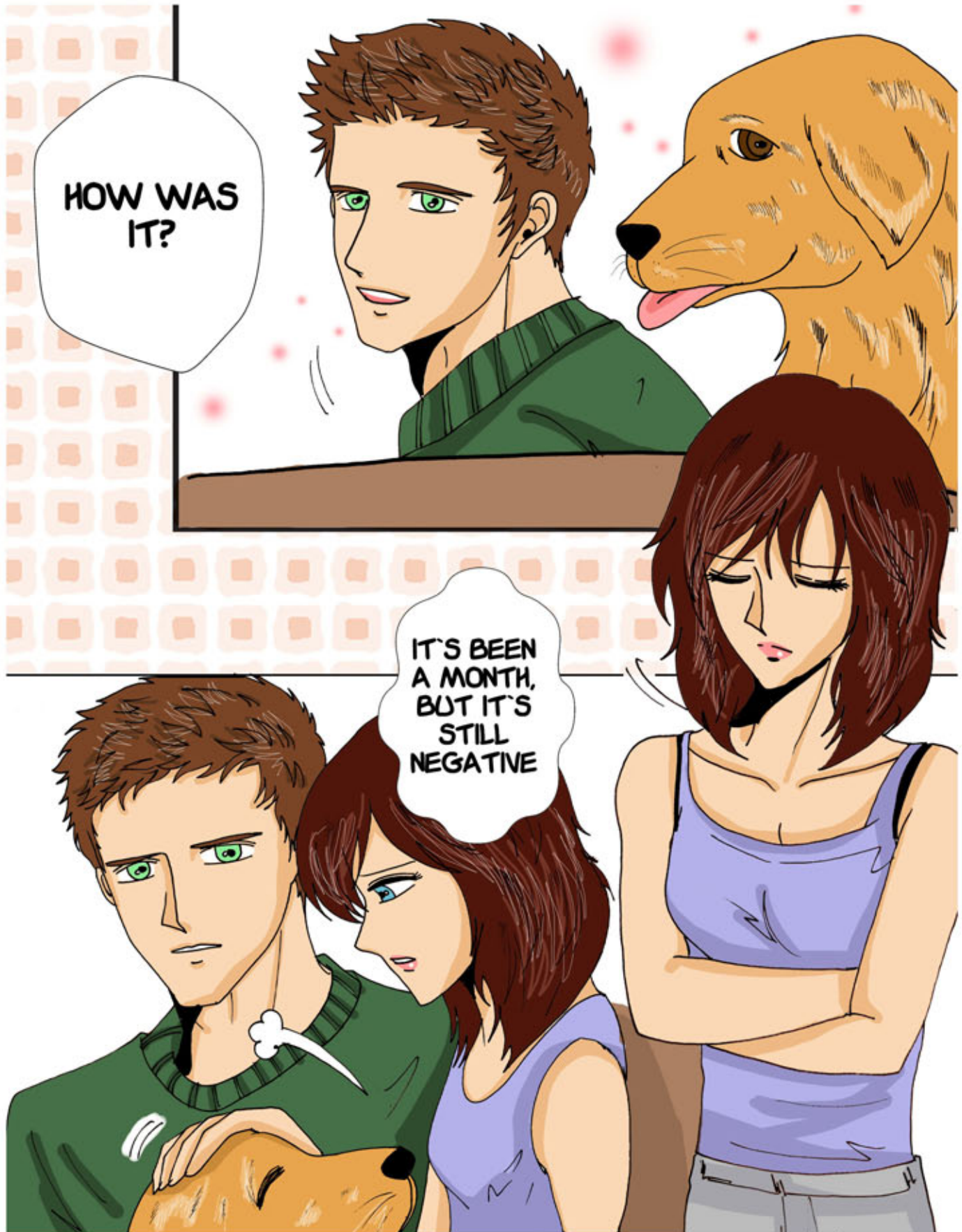
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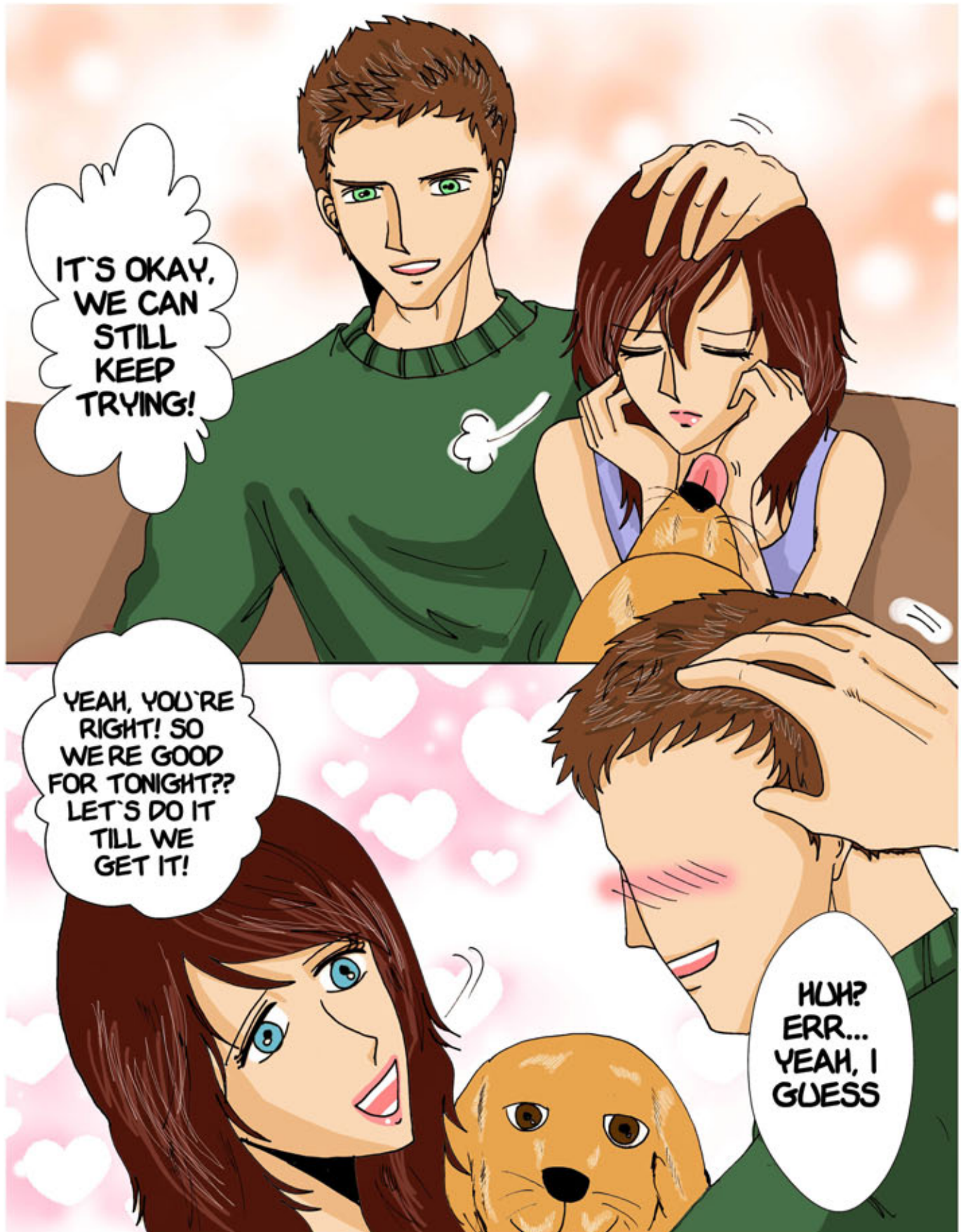
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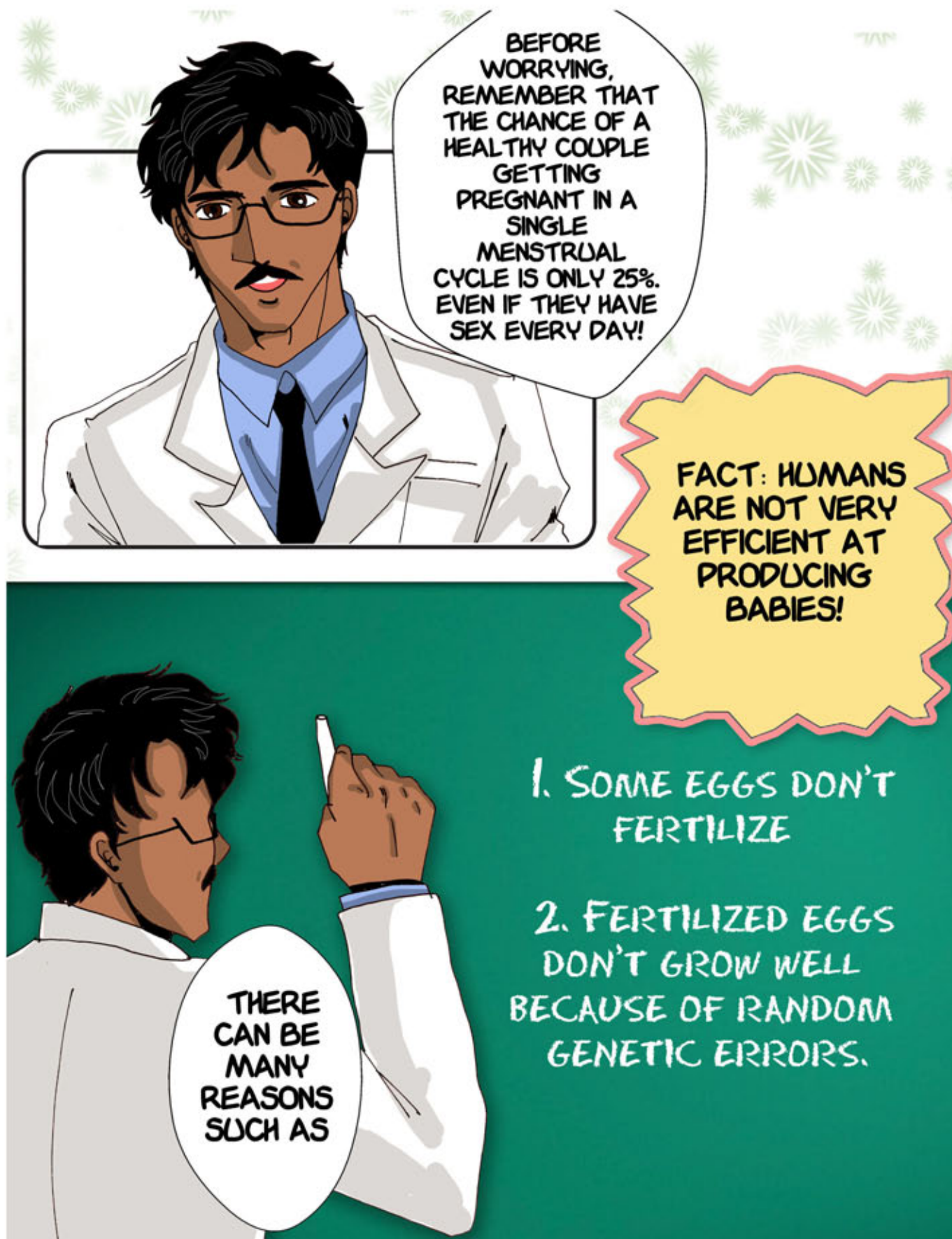
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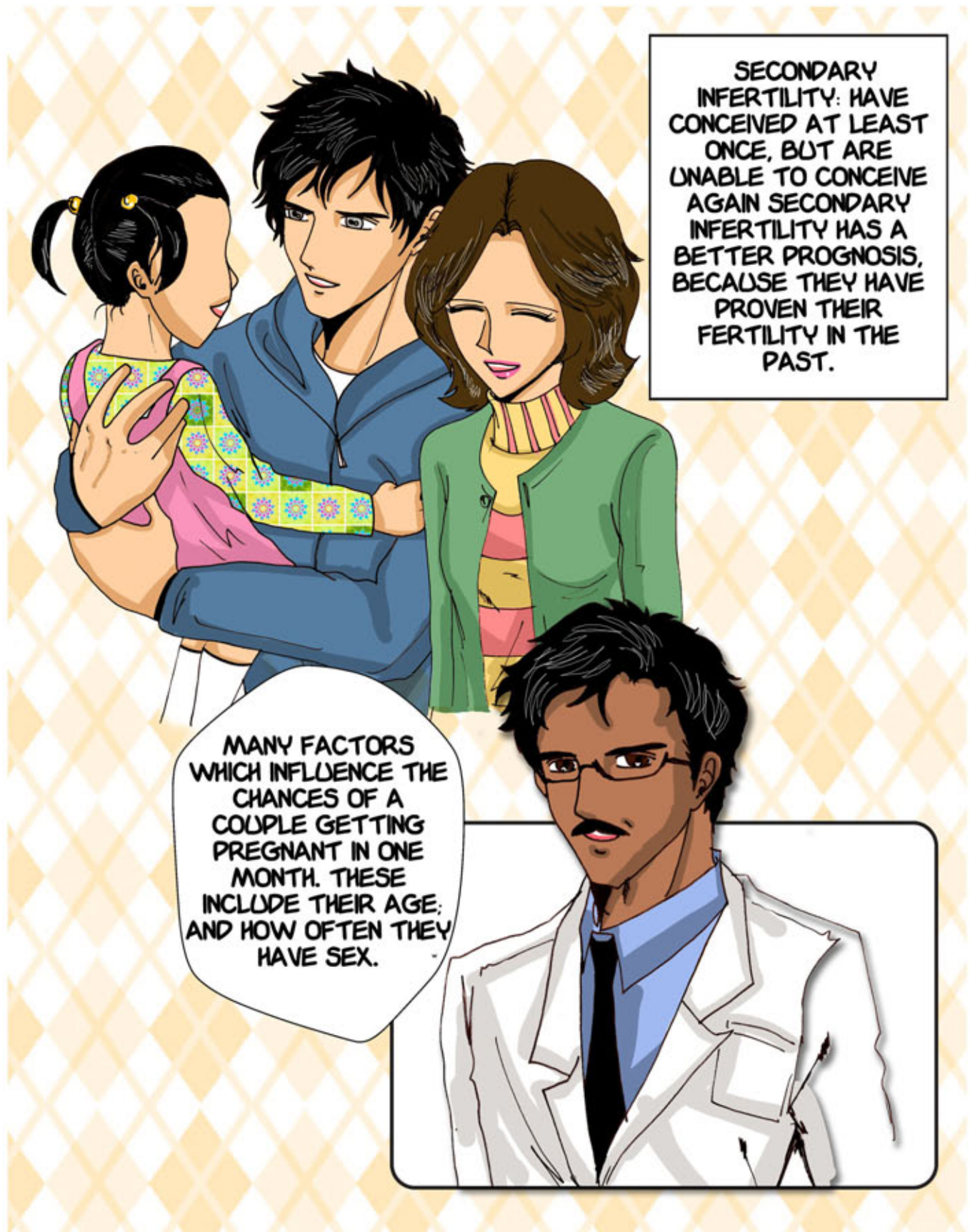
THINK OF IT
LIKE A GAME
OF ROULETTE

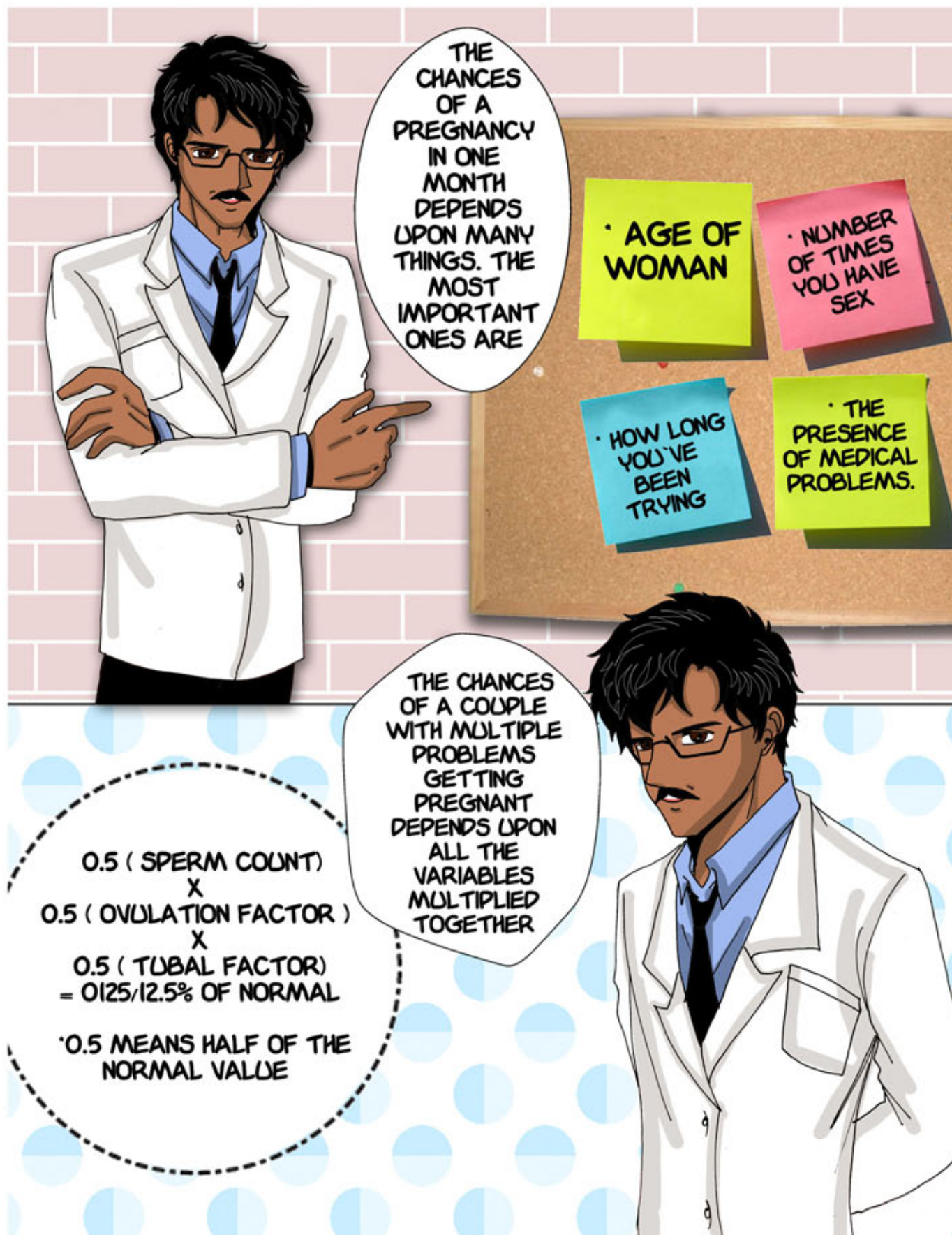
THERE ARE 2
TYPES OF
INFERTILITY

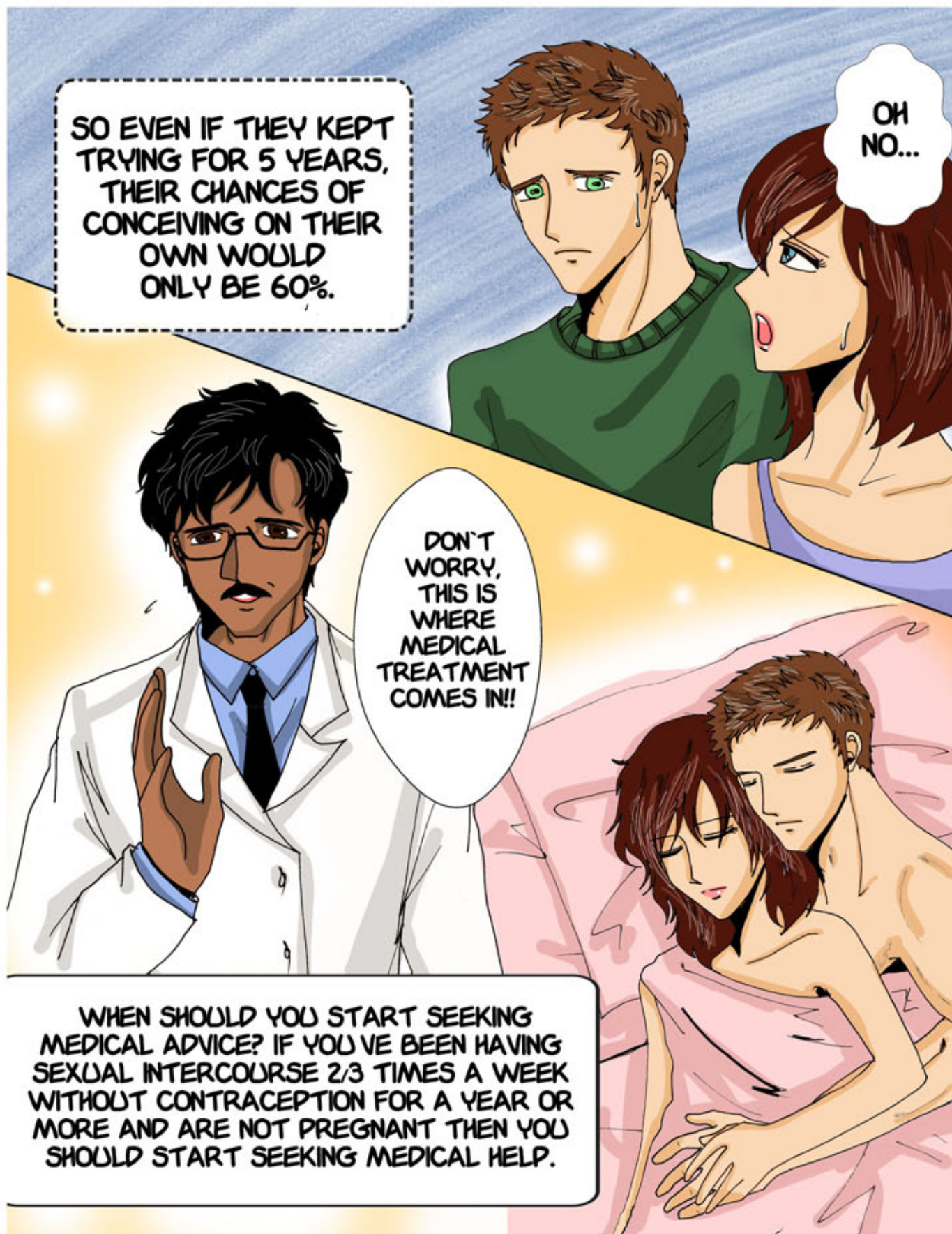
WE'RE
STILL
TRYING
THOUGH...

PRIMARY
INFERTILITY:
COUPLES WHO
HAVE NEVER
BEEN PREGNANT

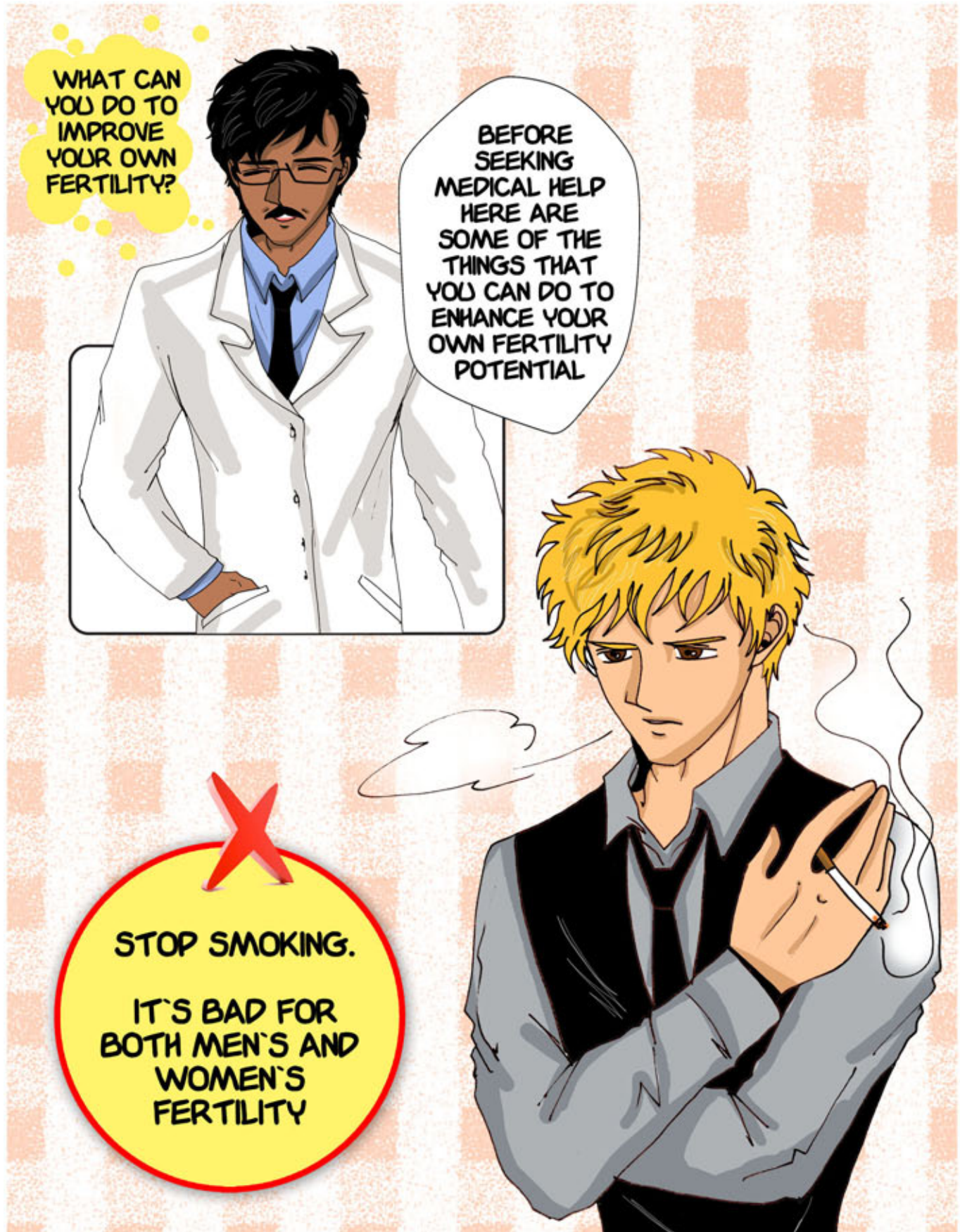














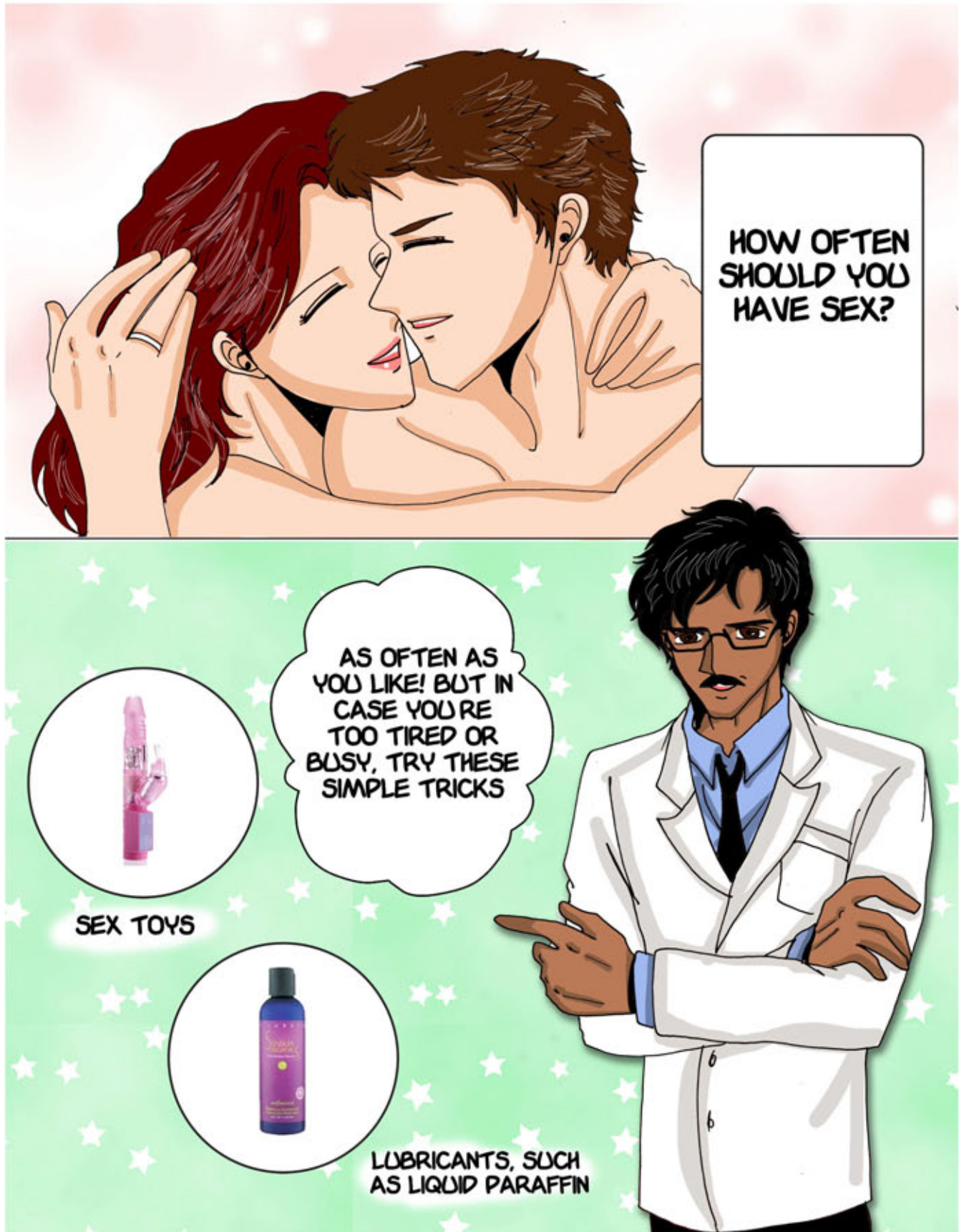
EXERCISE. REDUCING WEIGHT (IF YOU ARE OVERWEIGHT) CAN HELP YOU OVULATE

STOP DRINKING ALCOHOL. IT HAS BEEN ASSOCIATED WITH A LOW SPERM COUNT



YOU SHOULD ALSO REVIEW YOUR MEDICATIONS. SOME MEDICINES, SUCH AS SALAZOPYRINE, CAN REDUCE SPERM COUNTS. YOU SHOULD STOP USING DRUGS, MARIJUANA OR ANABOLIC STEROIDS AS THEY CAN ALSO REDUCE YOUR SPERM COUNTS.

YOU SHOULD ALSO LIMIT YOUR CAFFEINE INTAKE, SUCH AS COFFEE, TEA, AND SOFT DRINKS AND START TAKING VITAMIN SUPPLEMENTS WHICH CONTAIN FOLIC ACID





OR EVEN SEX GAMES!
IF YOU'RE TOO TIRED
TO DO IT AT NIGHT,
THEN DO IT IN THE
MORNING, OR MAYBE
HAVE A QUICKIE DURING
YOUR MORNING SHOWER.

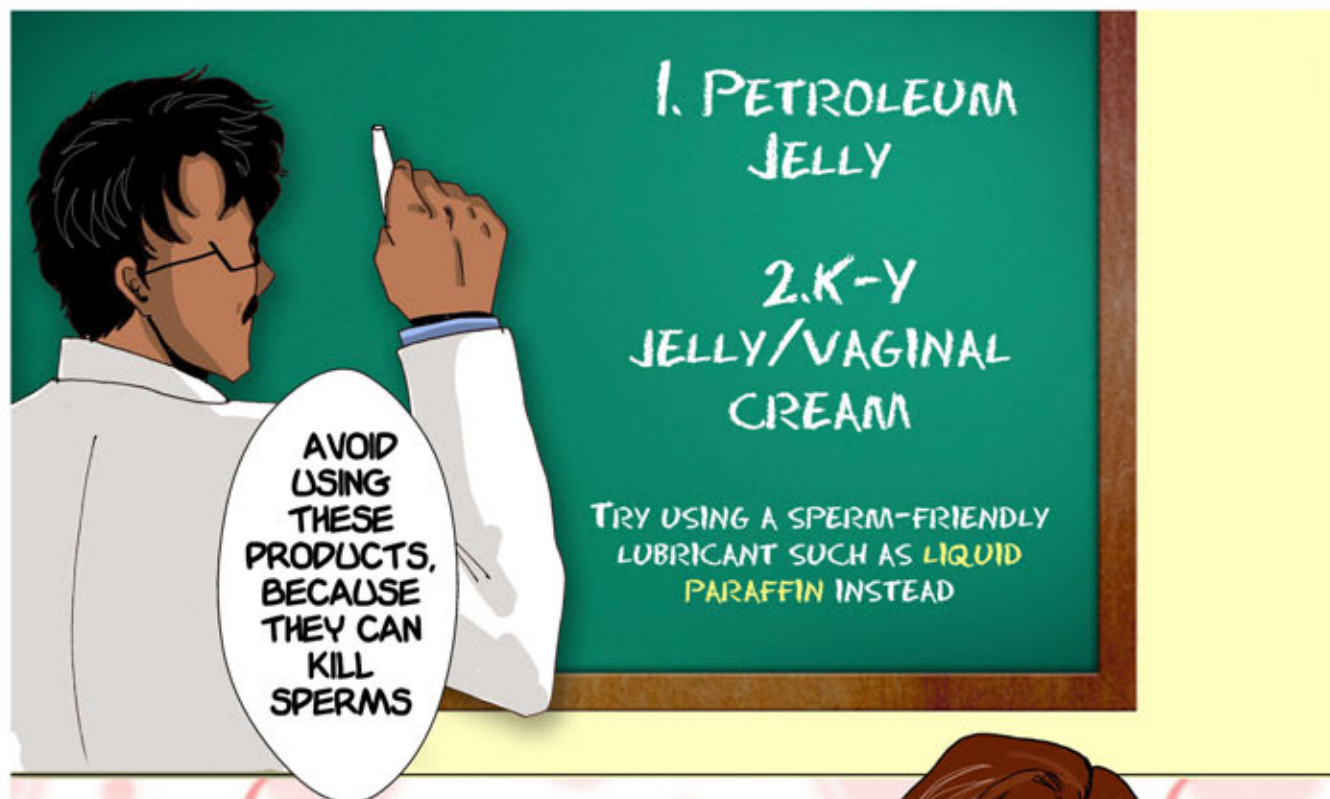
HOW CAN YOU TIME BABY MAKING SEX?

YOU CAN USE THE
FREE FERTILITY
CALCULATOR AT
[WWW.
MYFERTILETIME.IN](http://WWW.MYFERTILETIME.IN)

YOU CAN HAVE SEX
ANYTIME YOU LIKE
WITHOUT AFFECTING
YOUR FERTILITY. YOU
CANNOT RUN OUT OF
SPERM. THE FERTILE
TIME IS 4-5 DAYS
BEFORE OVULATION
OCCURS. YOU CAN
TIME YOUR OVULATION
USING VARIOUS TOOLS
SUCH AS OVULATION
TEST KITS







HOW CAN AN OLDER WOMAN CHECK HER FERTILITY POTENTIAL?

WOMEN OVER 30 SHOULD GET THEIR FSH AND AMH LEVEL CHECKED ON DAY 3 OF THEIR CYCLE. THIS IS A SIMPLE BLOOD TEST TO CHECK YOUR OVARIAN RESERVE. IF IT SHOWS POOR OVARIAN RESERVE, IT SHOULD BE A WAKE UP ALARM FOR YOU. BEWARE OF HERBAL MEDICINES WHICH CLAIM TO IMPROVE YOUR FERTILITY. MANY OF THESE ARE HOAXES WHICH RAISE FALSE HOPES.



HOW CAN YOU BALANCE YOUR FERTILITY AND CAREER?

IT'S A VERY TOUGH DECISION BECAUSE NOT ALL WORKPLACES GIVE FLEXIBILITY TO WOMEN WITH CHILDREN, BUT IT ALL DEPENDS ON YOU. SOME WOMEN CHOOSE BABY OVER CAREER, AND VICE VERSA

YOU JUST GOT PROMOTED!



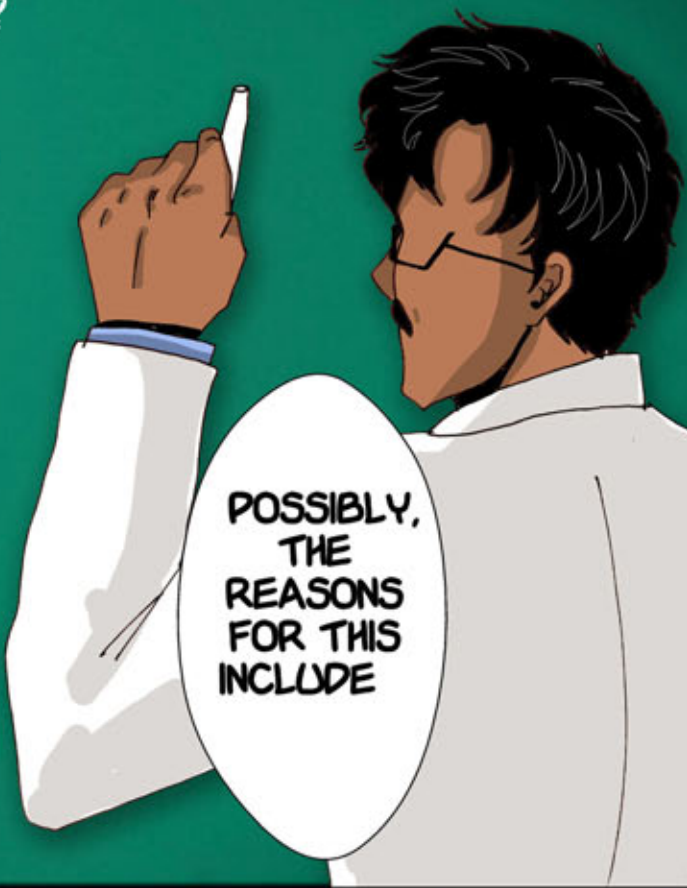
WHEN IS THE RIGHT TIME TO HAVE A BABY?

IT'S USUALLY BETWEEN THE AGE OF 20-30 IF YOU'RE OVER 35, IT WILL GET HARDER TO CONCEIVE. BUT IT IS A VERY PERSONAL AND INDIVIDUAL DECISION, WHICH COUPLES NEED TO MAKE FOR THEMSELVES

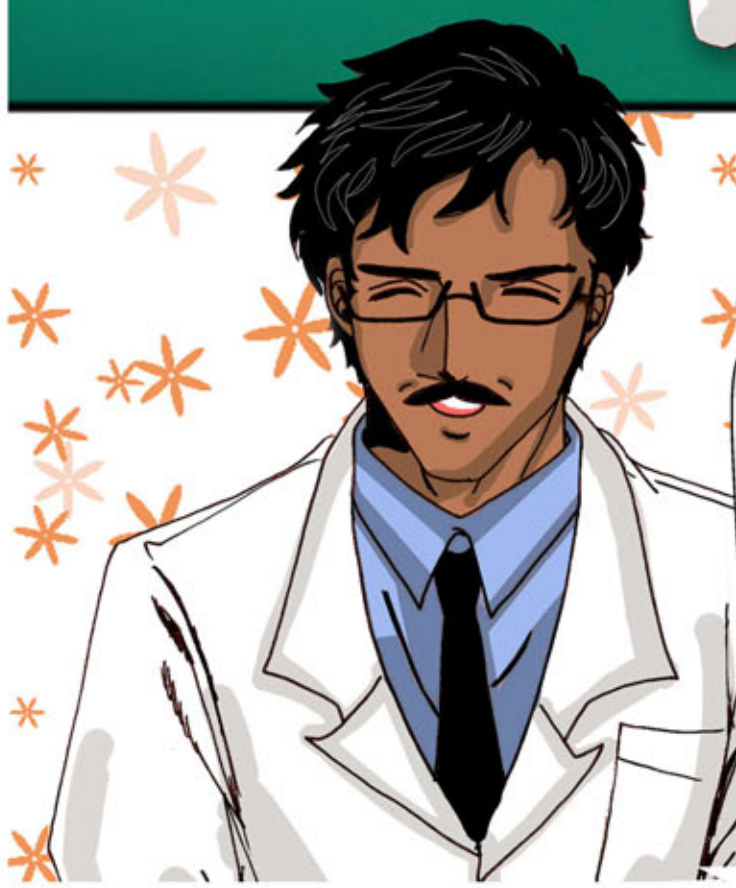


HAS THE FERTILITY OF COUPLES DECLINED IN MODERN TIMES?

1. THE INCREASED AGE OF WOMEN AT THE TIME OF MARRIAGE AND CHILD BEARING.
2. THE INCREASED INCIDENCE OF STD WHICH DAMAGE THE REPRODUCTIVE TRACT IN BOTH MEN AND WOMEN.
3. DECREASING SPERM COUNTS IN MEN. THE REASON, WHETHER IT'S STRESS OR ENVIRONMENTAL POLLUTION, IS STILL UNCLEAR.



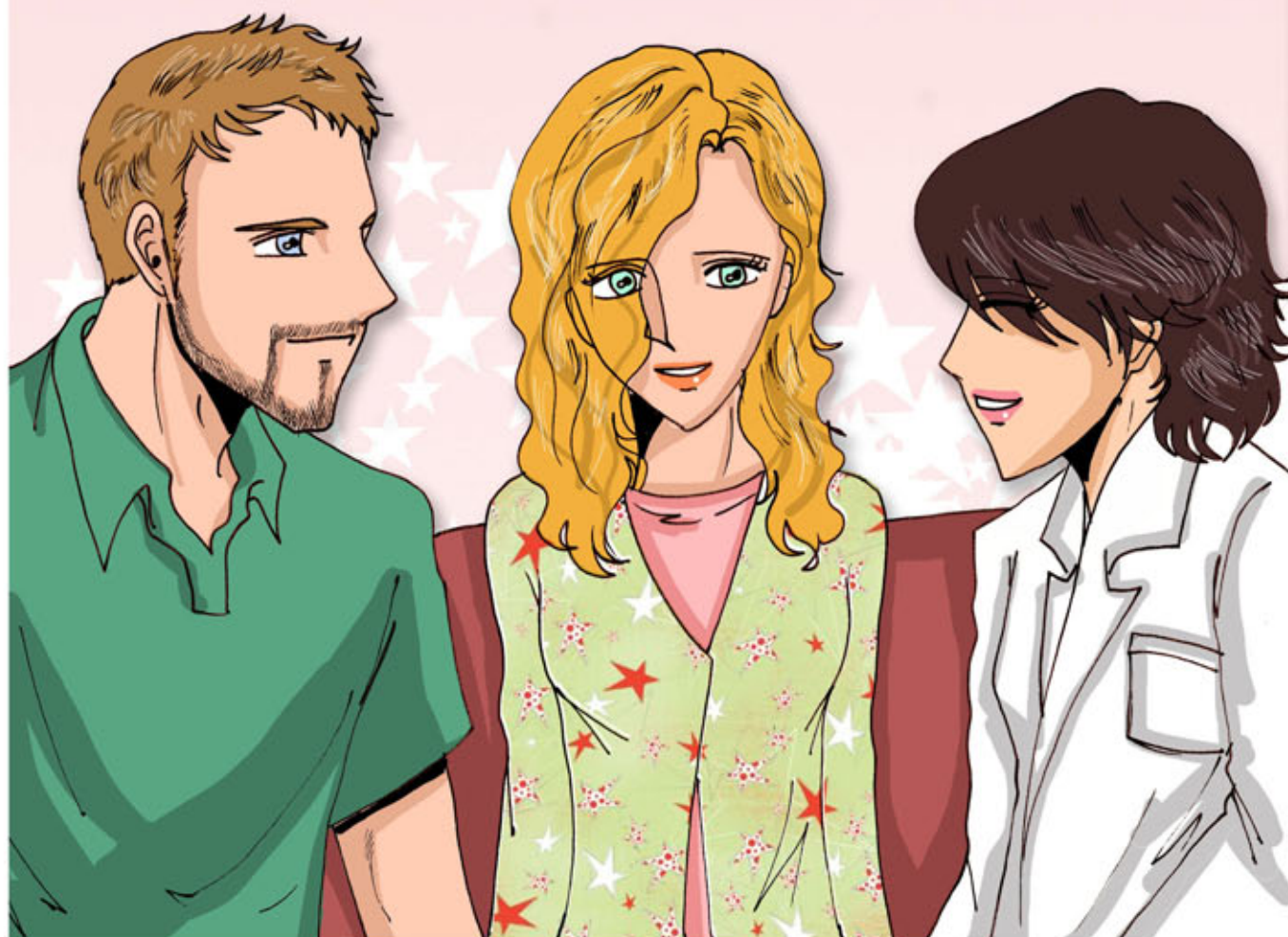
POSSIBLY,
THE
REASONS
FOR THIS
INCLUDE



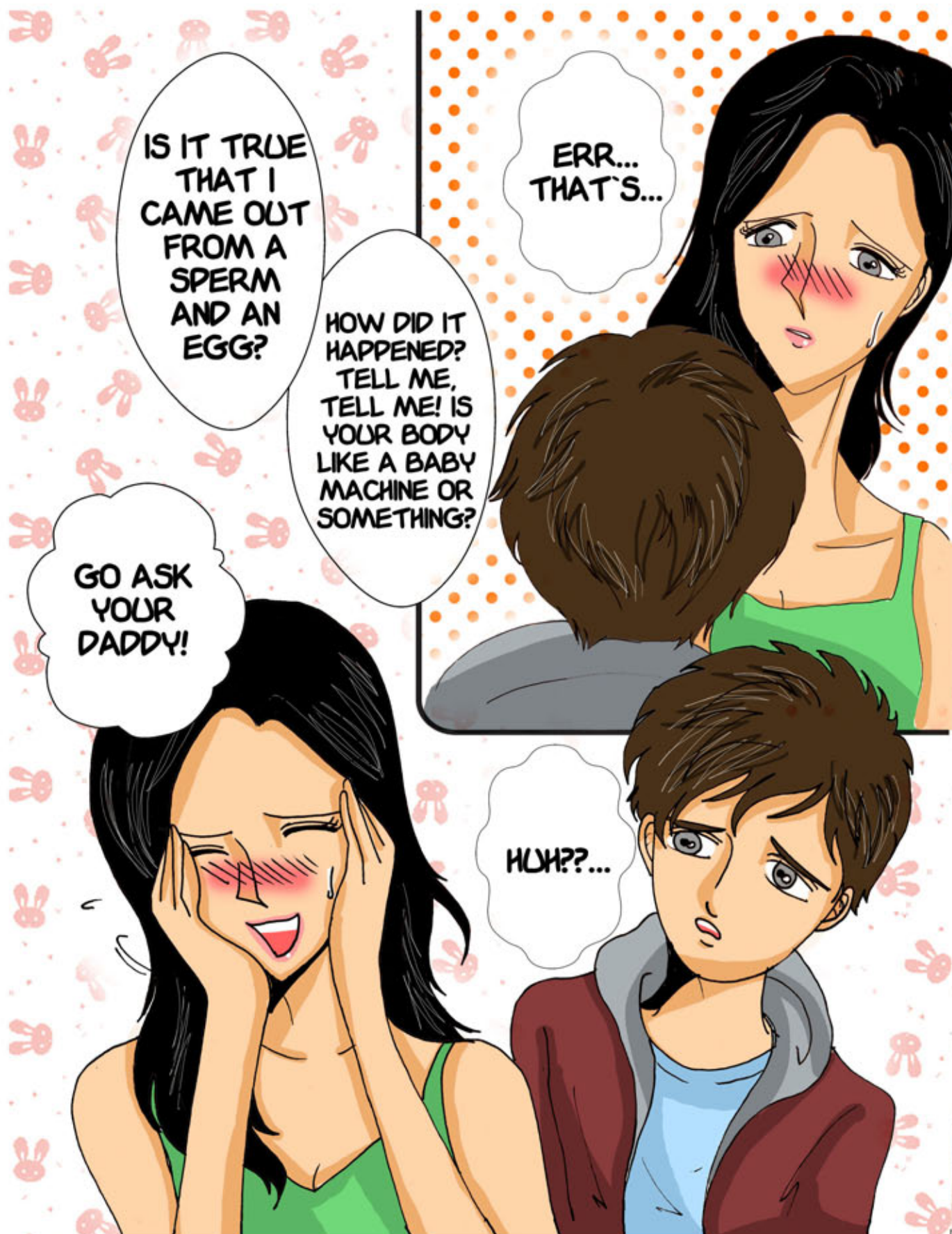
THE GOOD NEWS IS
THAT THERE IS AN
INCREASING
AWARENESS OF
INFERTILITY IN
SOCIETY TODAY, SO
IT'S NO LONGER
TABOO. SO IT'S
EASIER TO SEEK
MEDICAL HELP.

WHERE CAN I
GET HELP?

ASIDE FROM THE WEB AT
WWW.DRMALPANI.COM, YOU CAN
CONSULT YOUR FAMILY PHYSICIAN
WHO'LL REFER YOU TO AN
OBSTETRICIAN-GYNECOLOGIST,
WHEN INFERTILITY IS A CONCERN

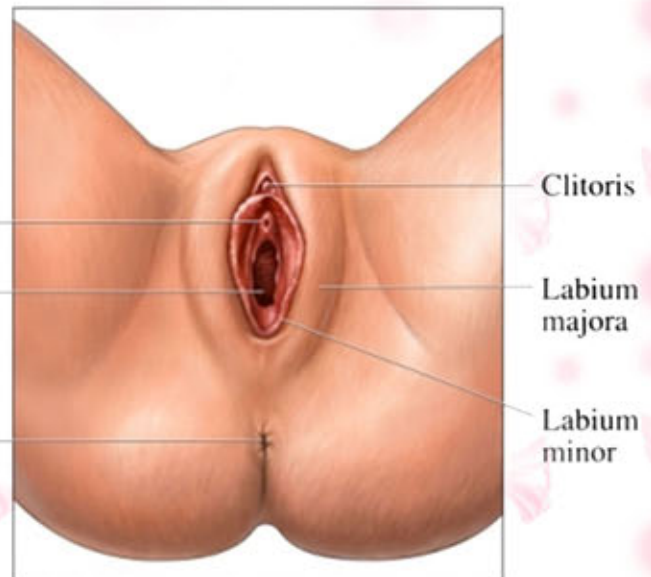


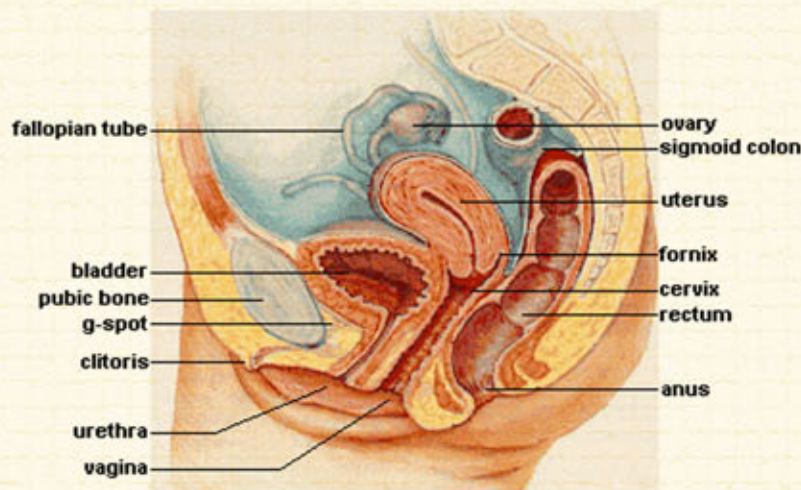






THE SEXUAL AND REPRODUCTIVE ORGANS ON THE OUTSIDE OF THE BODY ARE CALLED EXTERNAL GENITALS. THE OUTER GENITAL AREA IS CALLED THE VULVA. THE MOST SENSITIVE PART IS THE CLITORIS. ITS ONLY PURPOSE IS TO PROVIDE SEXUAL PLEASURES.



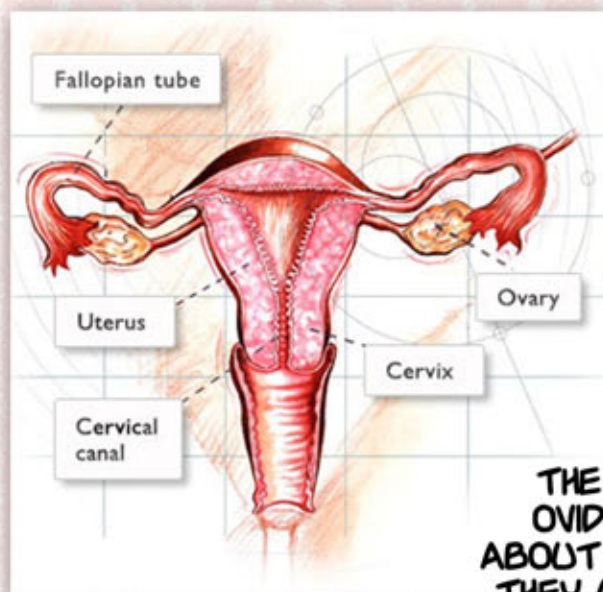


THE VAGINA IS A MUSCULAR TUNNEL THAT CONNECTS TO THE UTERUS, IT CAN STRETCH TO ACCOMMODATE A TAMPON, A PENIS, OR A BABY'S HEAD. THE WALLS OF THE VAGINA ARE MUSCULAR, MOIST, SMOOTH, AND SOFT

IF PREGNANCY DOESN'T OCCUR, THE LINING IS SHED ALONG WITH BLOOD AS THE MENSTRUAL FLOW

THE UTERUS, OR THE WOMB IS THE PLACE WHERE FERTILIZED EGGS GROWS AND DEVELOPED INTO A BABY. IT LIES DEEP IN THE LOWER ABDOMEN NEAR THE PELVIS, JUST BEHIND THE URINARY BLADDER. THE ENDOMETRIUM, THE RICH LINING INSIDE THE UTERUS, IS WHERE THE FERTILIZED EGG (EMBRYO) IMPLANTS

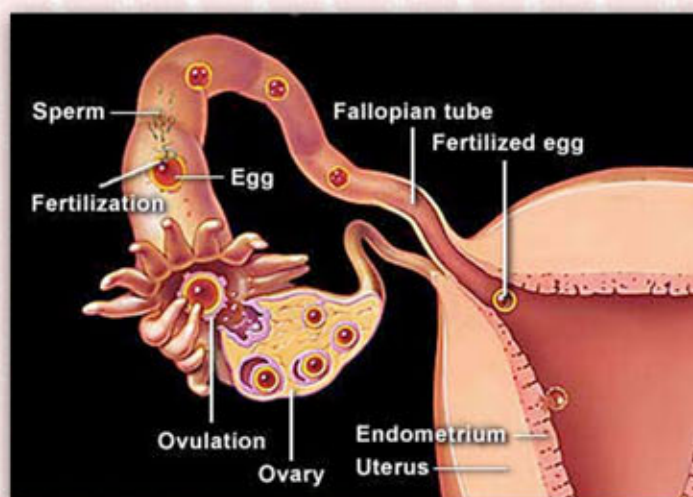




THE CERVIX CONNECTS THE UTERUS TO THE VAGINA AND CONTAINS SPECIAL GLANDS CALLED CRYPTS THAT MAKE CERVICAL MUCUS WHICH HELPS TO KEEP BACTERIA OUT OF THE UTERUS, IT ALSO HELPS SPERM TO ENTER THE UTERUS WHEN EGG IS RIPE.

THE TWO FALLOPIAN TUBES, OR THE OVIDUCTS, ARE ABOUT 10 CM LONG. ABOUT AS BIG AS A PIECE OF SPAGHETTI. THEY ACT AS A PASSAGE WAY FOR THE EGG TO TRAVEL FROM THE OVARY TO THE UTERUS.

THE TUBE IS LINED WITH CELLS WHICH HAVE HAIRLIKE PROJECTIONS CALLED CILIA THAT BEAT RHYTHMICALLY TO PROPEL THE EGG FORWARD. BUT IT'S NOT JUST A PATHWAY, BECAUSE IT ALSO NOURISHES THE EGG AND THE EARLY EMBRYO. ALSO, THE SPERM FERTILIZES THE EGG IN ONE OF THE FALLOPIAN TUBES.



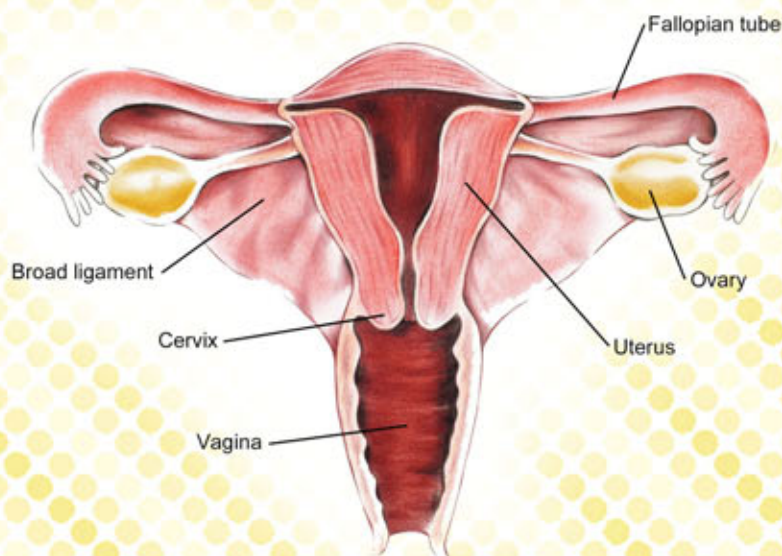
THE OVARY SERVES 2 FUNCTIONS: PRODUCTION OF EGGS AND SECRETION OF THE FEMALE HORMONES. EACH MONTH AT THE TIME OF OVULATION, A MATURE EGG IS RELEASED BY AN OVARY. THIS IS PICKED UP BY THE FIMBRIA AND DRAWN INTO THE FALLOPIAN TUBES.





NOW I SHALL
EXPLAIN THE
MENSTRUAL
CYCLE AND ITS
ROLE IN FERTILITY

THE MENSTRUAL
CYCLE IS THE TIME
FROM THE BEGINNING
OF ONE PERIOD TO THE
NEXT ONE. DAY 1 IS
THE DAY THE
MENSTRUAL FLOW
STARTS. USUALLY
THE CYCLE LASTS
ABOUT 28-35 DAYS,
BUT 3-6 WEEKS IS
STILL CONSIDERED
NORMAL



DURING THE CYCLE, THE
UTERUS GETS READY
FOR PREGNANCY. DUE TO
HORMONES, THE LINING
GROW THICK TO
PREPARE THE
FERTILIZED EGG, BUT IF
PREGNANCY DOESN'T
OCCUR, THE UTERUS
MUST GET RID OF THE
LINING SO IT CAN GROW A
NEW ONE FOR THE NEXT
CYCLE.

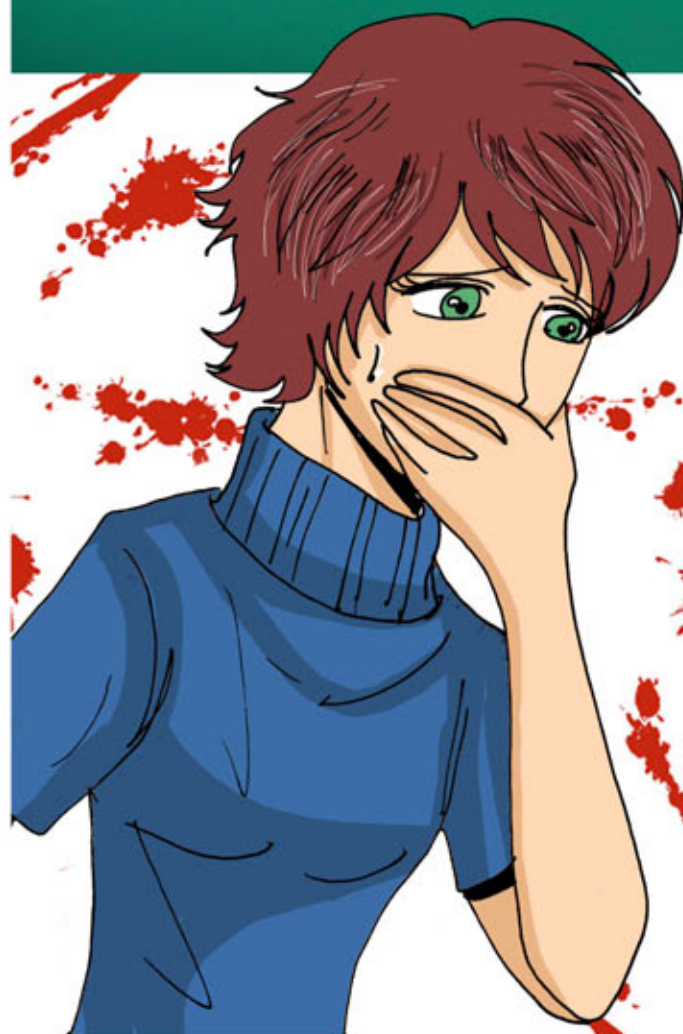


IT CONSISTS OF

1. THE SHED UTERINE LINING
2. BLOOD (THIS COMES FROM BLOOD VESSELS WHICH ARE TORN WHEN LINING IS SHED)
3. THE DEGENERATED FERTILIZED EGG



THE OLD LINING PASSES OUT OF THE UTERUS THROUGH THE VAGINA AS THE MENSTRUAL FLOW



IF THE MENSTRUAL FLOW IS HEAVY, THERE MIGHT BE CLOTS IN IT. SOMETIMES THE UTERINE LINING IS SHED AS LARGE FRAGMENTS. THESE MAY LOOK LIKE BITS OF PREGNANCY TISSUE TO SOME WOMEN, WHO THINK THEY ARE MISCARRYING.







REPRODUCTION IS LIKE AN ORCHESTRA. THE REPRODUCTIVE ORGANS NEEDS TO BE SYNCHRONIZED TO PERFORM AT THE RIGHT TIME IN ORDER FOR THEM TO WORK PROPERLY. IT IS THE FERTILITY HORMONES WHICH PLAY THE CONDUCTOR'S ROLE

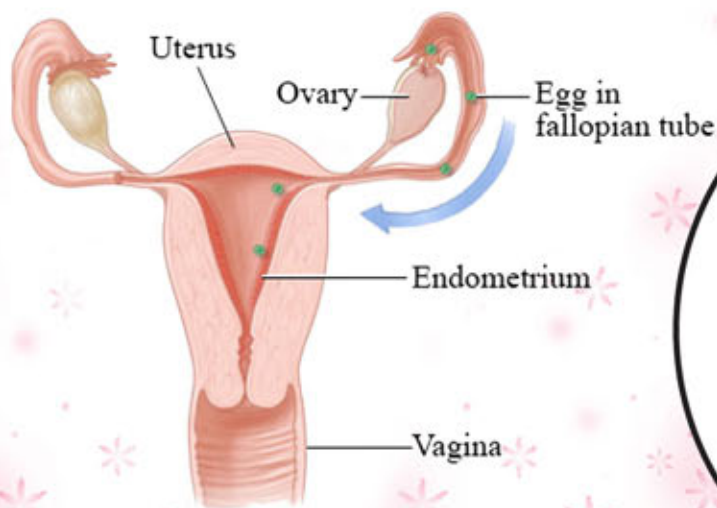


ESTROGEN



PROGESTERONE

HORMONES ARE CHEMICALS THE BODY MAKES TO CARRY MESSAGES FROM ONE PART OF THE BODY TO ANOTHER. THOSE TWO ARE THE MAJOR FEMALE HORMONES PRODUCED BY THE OVARIES. THE CYCLE OF OVARIAN HORMONE PRODUCTION HAS 2 PHASES. THE FIRST HALF IS CALLED THE FOLLICULAR PHASE.



DURING THIS PHASE THE EGG MATURES INSIDE THE OVARY IN ITS FOLLICLE. THE FOLLICLE SECRETES A LARGE AMOUNT OF ESTROGEN INTO THE BLOODSTREAM, AND THE ESTROGEN CIRCULATES TO THE UTERUS WHERE IT STIMULATES THE ENDOMETRIUM TO THICKEN.

THE SECOND PHASE OF HORMONE PRODUCTION BEGINS AT OVULATION, MIDWAY THROUGH THE CYCLE, WHEN THE FOLLICLE CHANGES INTO THE CORPUS LUTEUM. THIS PRODUCES ESTROGEN, AND ALSO LARGE QUANTITIES OF PROGESTERONE THROUGHOUT THE SECOND HALF OF THE CYCLE.





TRAVELING THROUGH THE BLOODSTREAM TO THE UTERUS, PROGESTERONE COMPLEMENTS THE WORK BEGUN BY ESTROGEN BY STIMULATING THE ENDOMETRIUM TO MATURE AND MAKING IT POSSIBLE FOR A FERTILIZED EGG TO IMPLANT IN IT. IN CASE PREGNANCY DOES NOT OCCUR, PRODUCTION OF ESTROGEN AND PROGESTERONE FALLS 10 TO 14 DAYS AFTER OVULATION AS THE CORPUS LUTEUM DIES, AND THE ENDOMETRIUM IS SHED FROM THE BODY AS THE MENSTRUAL PERIOD.



HOW IS THE RELEASE OF HORMONES REGULATED BY THE BODY?

THIS IS A COMPLEX SELF-REGULATING SYSTEM, WHICH USES NEGATIVE FEEDBACK CONTROL LOOPS, MUCH LIKE A THERMOSTAT FOR AN OVEN DOES.



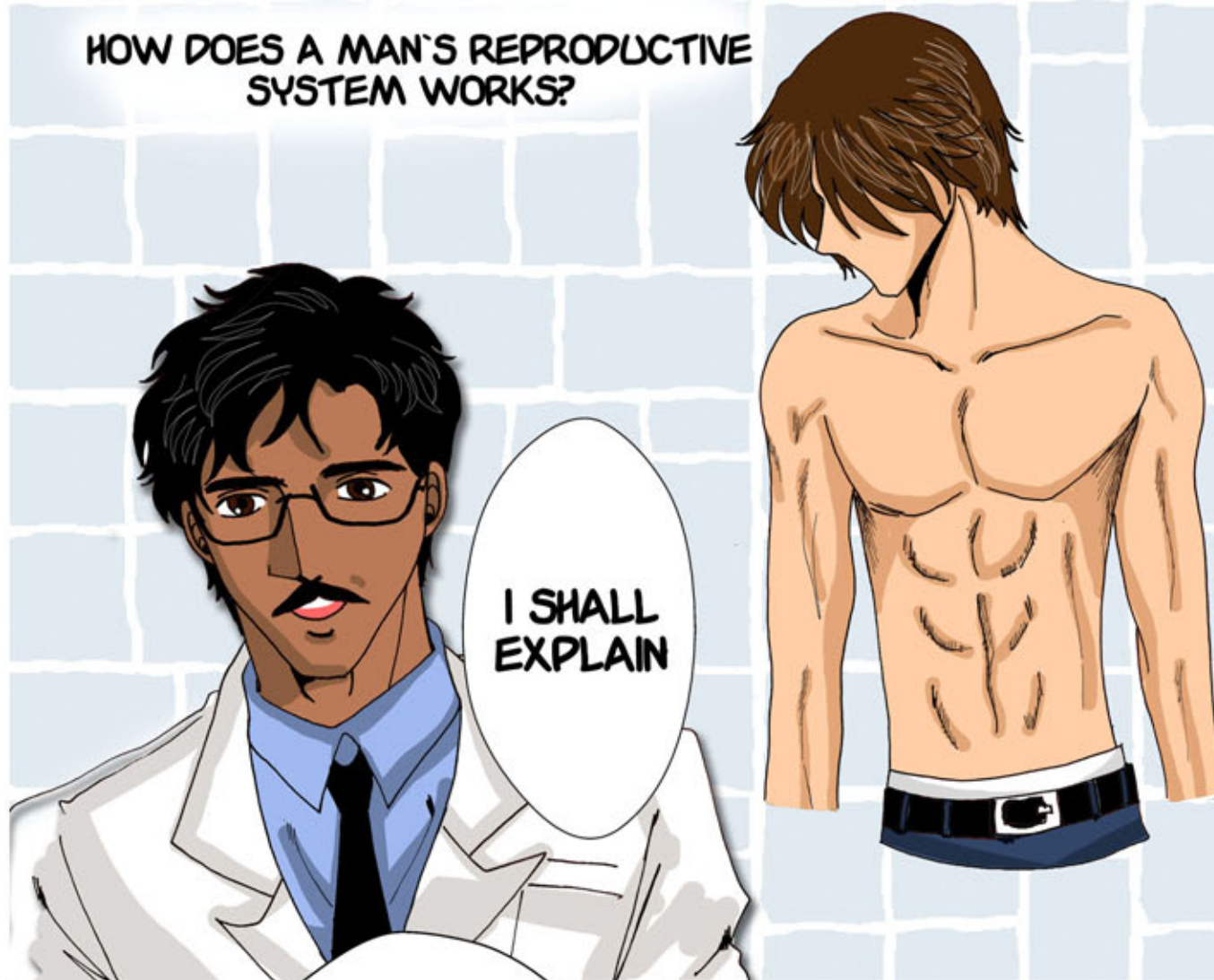
AS THE TEMPERATURE INCREASES, THE THERMOSTAT SHUTS OFF THE HEATER TO REDUCE ITS HEAT OUTPUT. WHEN THE TEMPERATURE FALLS BELOW THE THERMOSTAT'S SETTING, THE THERMOSTAT SIGNALS THE HEATER TO TURN UP THE HEAT AGAIN, THUS MAINTAINING THE DESIRED TEMPERATURE.

A SIMILAR SIGNALING RELATIONSHIP EXISTS BETWEEN THE PITUITARY GLAND AND THE OVARIES IN WOMEN; AND THE TESTES IN MEN

FOR EXAMPLE, AS THE CONCENTRATION OF GONADOTROPINS IN THE BLOOD RISES, THIS SIGNALS THE WOMAN'S OVARIES TO INCREASE HORMONAL OUTPUT OF ESTROGEN. IN TURN, WHEN THE BLOOD LEVELS OF ESTROGEN RISE, THE PITUITARY GLAND SLOWS ITS RELEASE OF GONADOTROPINS, THUS MAINTAINING THE DESIRED EQUILIBRIUM

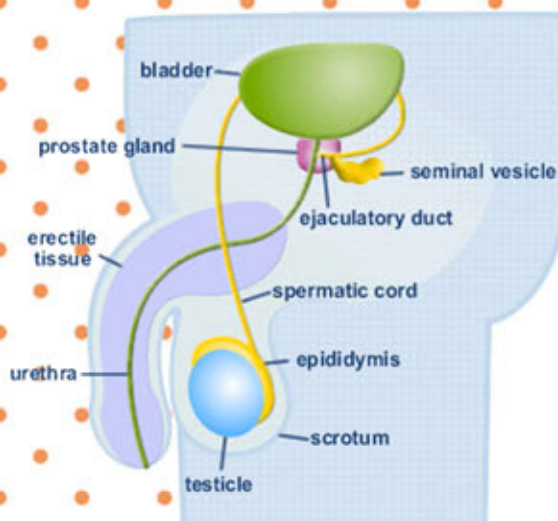


HOW DOES A MAN'S REPRODUCTIVE SYSTEM WORKS?



I SHALL EXPLAIN

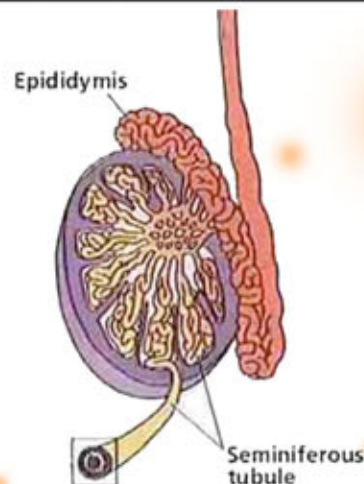
IT BEGINS IN THE SCROTUM, THE SACK BEHIND THE PENIS. THIS CONTAINS TWO TESTES OR TESTICLES, WHICH MAKE MEN'S SEX CELLS, CALLED SPERM; AND THE MALE SEX HORMONE, CALLED TESTOSTERONE



THE TESTICLES FEEL SOLID, BUT A LITTLE SPONGY, LIKE HARD BOILED EGGS WITHOUT THE SHELL. THEY HANG FROM A CORD CALLED THE SPERMATIC CORD. IT'S NORMAL FOR ONE TESTICLE TO HANG LOWER THAN THE OTHER; AND FOR ONE TESTICLE TO FEEL SLIGHTLY LARGER THAN THE OTHER.

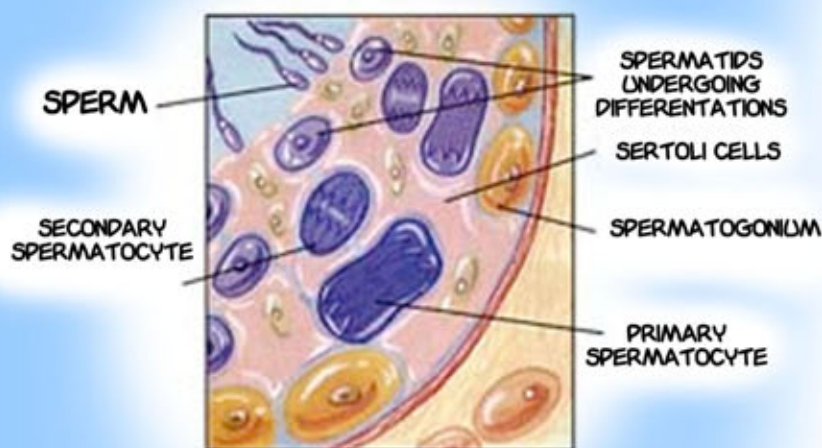


THE TESTICLES START MAKING SPERM WHEN A YOUNG MAN REACHES PUBERTY. THIS IS IN RESPONSE TO THE MALE SEX HORMONE, TESTOSTERONE, WHICH STARTS BEING PRODUCED AT THIS TIME. THE TESTES KEEP MAKING SPERM FOR THE REST OF THE MAN'S LIFE.



THE TESTES HAVE TWO COMPONENTS, THE SEMINIFEROUS TUBULES AND THE "INTERSTITIUM" OR THE TISSUE IN BETWEEN THE TUBULES, WHICH CONTAIN THE LEYDIG CELLS WHICH PRODUCE THE MALE SEX HORMONE, TESTOSTERONE, WHICH CAUSES THE MALE SEXUAL DRIVE.

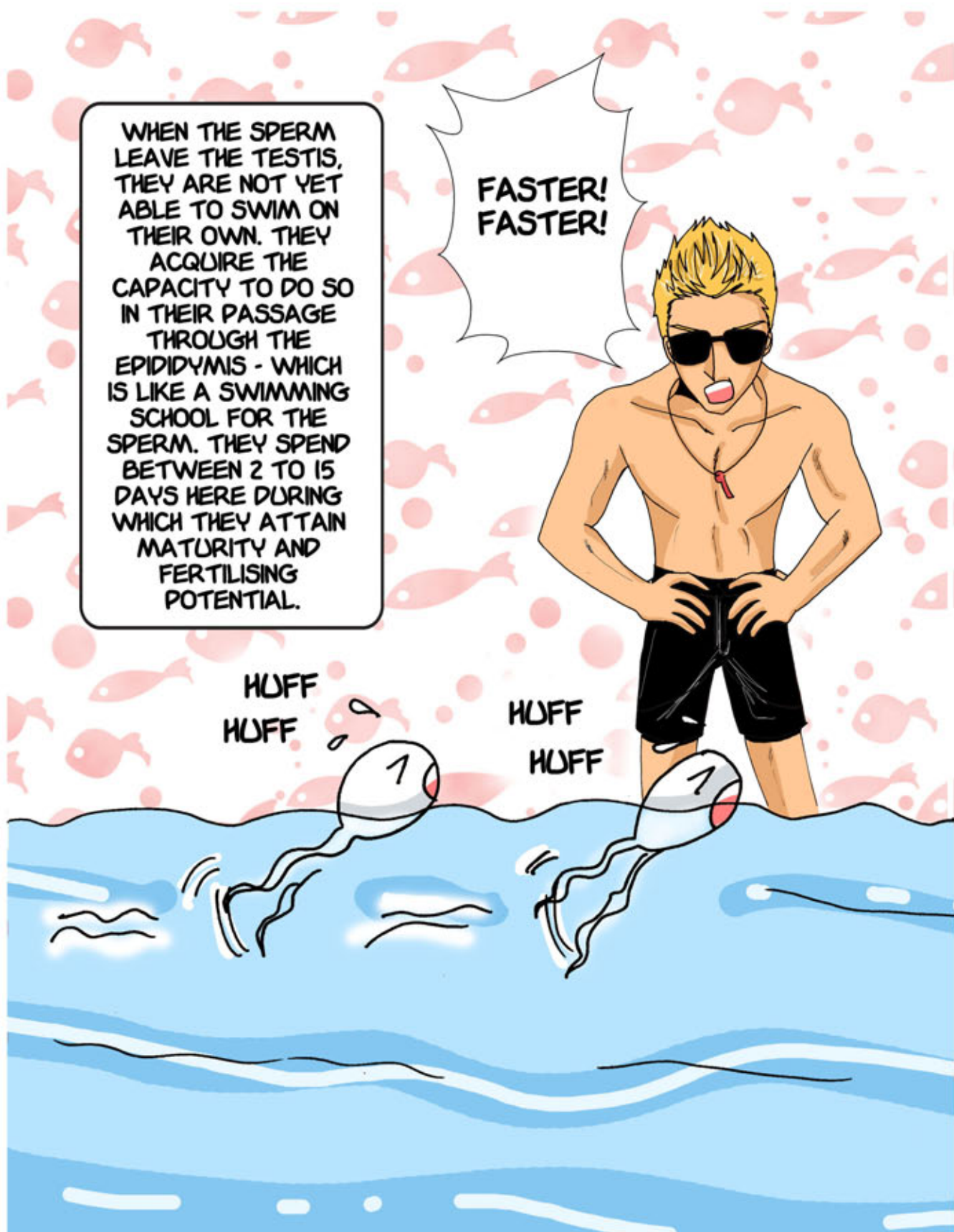
THE SPERMS ARE PRODUCED INSIDE THE SEMINIFEROUS TUBULE, AND THESE CONVERGE AND COLLECT INTO A DELTA (LIKE THE MOUTH OF A RIVER) NEAR THE UPPER PART OF THE TESTIS CALLED THE RETESTIS WHICH THEN EMPTIES THROUGH A SERIES OF VERY SMALL DUCTS OUT OF THE TESTIS TOWARDS THE EPIDIDYMIS.



MATURE SPERM TAKE ABOUT 75 DAYS TO DEVELOP IN A PROCESS CALLED SPERMATOGENESIS WHICH TAKES PLACE IN THE SEMINIFEROUS TUBULES. THE PRIMORDIAL GERM CELLS IN THE TESTIS, CALLED THE SPERMATOGONIA, WHICH ARE "IMMORTAL" STEM CELLS, DIVIDE REPEATEDLY TO FORM PRIMARY SPERMATOCYTES. THESE UNDERGO MEIOTIC (REDUCTION) DIVISION TO FORM SECONDARY SPERMATOCYTES, WHICH DIFFERENTIATE TO FORM SPERMATIDS, WHICH THEN ULTIMATELY MATURE TO FORM SPERMATOZOA.





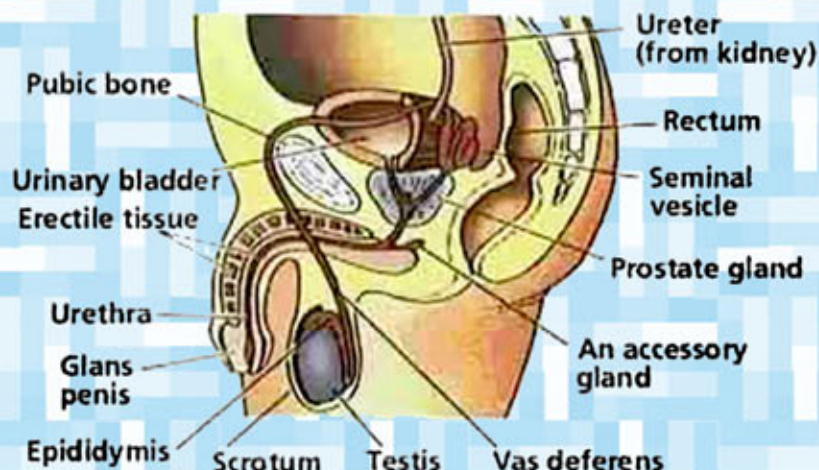




SPERM ARE PROPELLED
ALONG THIS TUNNEL BY
FREQUENT CONTRACTIONS OF
ITS THIN MUSCULAR WALL.
MOST OF THE MATURE
SPERM ARE THEN STORED AT
THE END OF THE EPIDIDYMIS

THAT'S
WHEN THEY'RE
WAITING TO BE
RUSHED
THROUGH THE
VAS DEFERENS
AND
EJACULATED AT
THE TIME OF
ORGASM.



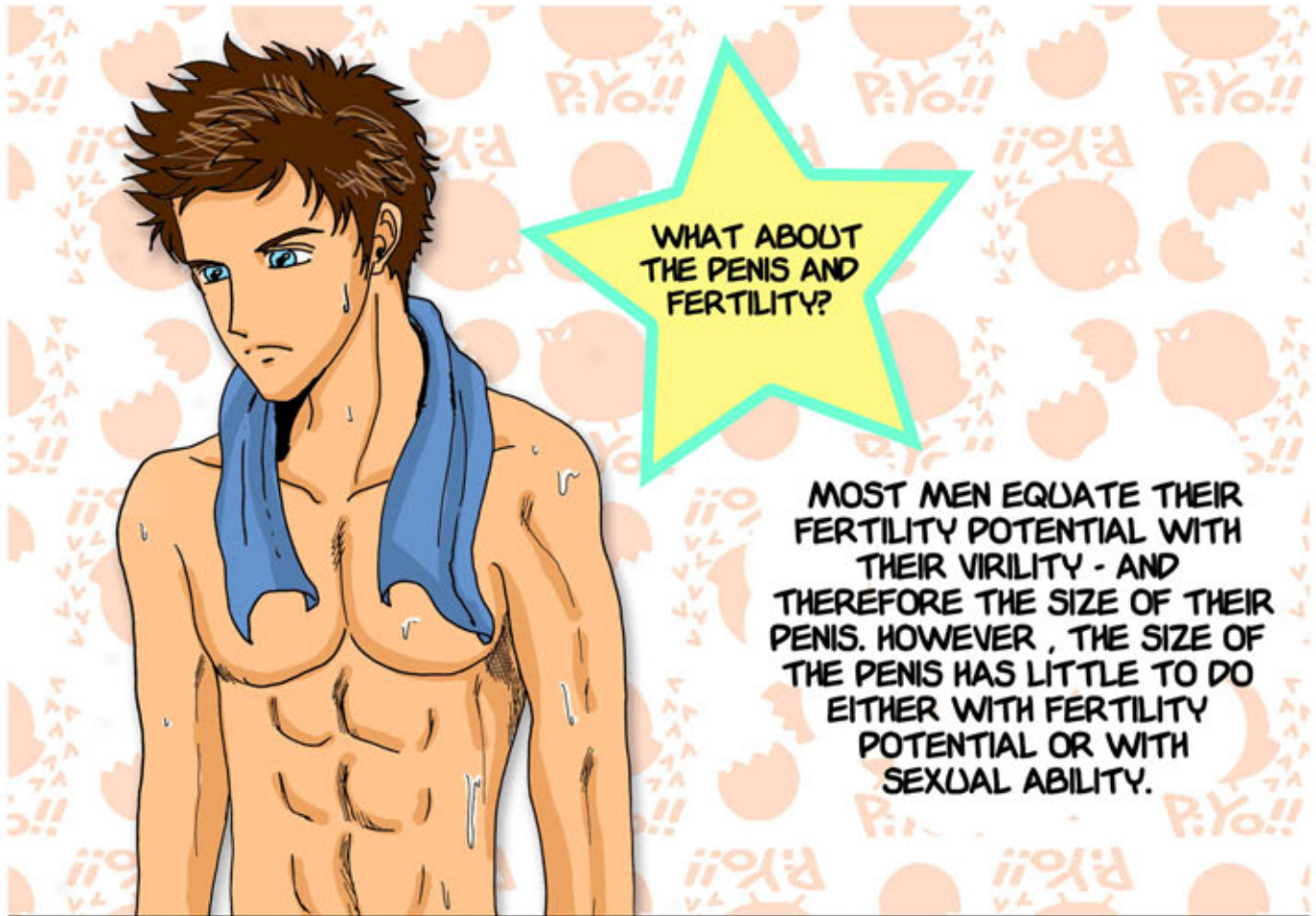


DURING EJACULATION, THE EPIDIDYMIS AND VAS DEFERENS MUSCLES CONTRACT TO PROPEL THE SPERM INTO THE EJACULATORY DUCT. HERE THE SPERM IS JOINED WITH THE SECRECTIONS OF THE SEMINAL VESICLES AND PROSTATE GLAND TO FORM THE SEMEN. THE POWERFUL MUSCLES SURROUNDING THE BASE OF THE URETHRA THEN CAUSE THE SEMEN TO SQUIRT OUT OF THE PENIS AT THE TIME OF ORGASM



SEMEN AND URINE NEVER MIX IN A HEALTHY MALE

IT'S BECAUSE THE BLADDER SPHINCTER MUSCLE CONTRACTS DURING SEXUAL STIMULATION, THUS CLOSING DOWN THE EXIT FROM THE BLADDER TO THE URETHRA DURING EJACULATION - PREVENTING URINE FROM LEAKING FORWARD OUT OF THE BLADDER DURING SEX AND ALSO PREVENTING SEMEN FROM ACCIDENTALLY GOING BACKWARD INTO THE BLADDER.



WHAT ABOUT
THE PENIS AND
FERTILITY?

MOST MEN EQUATE THEIR FERTILITY POTENTIAL WITH THEIR VIRILITY - AND THEREFORE THE SIZE OF THEIR PENIS. HOWEVER, THE SIZE OF THE PENIS HAS LITTLE TO DO EITHER WITH FERTILITY POTENTIAL OR WITH SEXUAL ABILITY.

DURING EJACULATION, ABOUT ONE TEASPOON OF SEMEN SPURTS OUT OF THE PENIS. SEMEN IS A MILKY WHITE COLOR, THE CONSISTENCY OF EGG WHITE. SPERM ACCOUNT FOR ONLY ABOUT 2 TO 3% OF SEMEN. MOST OF IT CONSISTS OF SEMINAL FLUID - THE SECRETION OF THE SEMINAL VESICLES AND THE PROSTATE GLAND, WHICH PROVIDE A VEHICLE FOR THE SPERM INTO THE VAGINA.





A NORMAL EJACULATION CONTAINS 200 TO 500 MILLION SPERM. HOW CAN SO MANY SPERM FIT INTO ONLY A TEASPOON OF SEMEN ?

SIMPLE - SPERM ARE VERY TINY. IF ONE AVERAGE EJACULATION FILLED AN OLYMPIC SIZE SWIMMING POOL, EACH SPERM CELL WOULD STILL BE SMALLER THAN A GOLDFISH.

SPERM ARE THE SMALLEST LIVING CELLS IN THE HUMAN BODY - AND THE EGG THE LARGEST. BASICALLY, SPERM ARE DESIGNED SO THAT THEY CAN DELIVER THEIR CONTENTS - THE MALE GENETIC MATERIAL - TO THE EGG. THIS IS WHY THEY ARE DESIGNED LIKE PROJECTILES - THE MALE DNA IS IN THE CHROMOSOMES IN THE SPERM HEAD NUCLEUS, AND THE TAIL PROPELS THE SPERM UP TOWARDS THE EGG.





SPERM ARE ALSO VERY FRAGILE. MEN MAKE SO MANY BECAUSE VERY FEW SURVIVE THE SWIM THROUGH THE FEMALE REPRODUCTIVE SYSTEM TO FERTILIZE AN EGG.



PERHAPS THE REASON FOR THIS IS AN EVOLUTIONARY HANGOVER. FEMALE FISH DEPOSIT EGGS ON THE SEA-BED. THIS IS WHY MALE FISH NEED TO PRODUCE MILLIONS OF SPERM WHICH ARE SPRAYED INTO THE SEA WATER WHERE MILLIONS WILL BE WASTED IN ORDER TO ENSURE THAT SOME REACH THE EGGS.

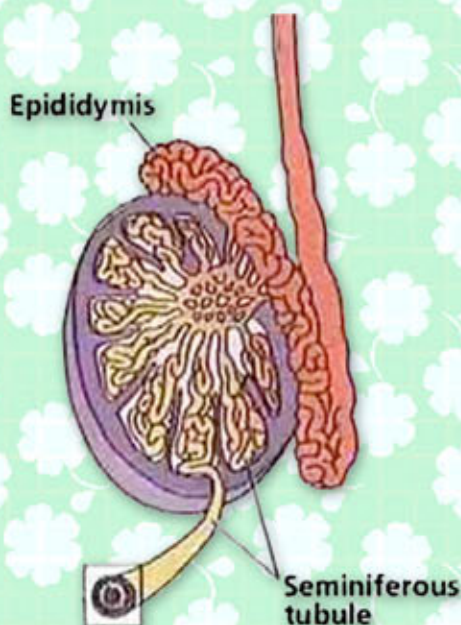


WHAT HAPPENS TO THE SPERMS IF YOU DON'T HAVE SEX FOR MANY DAYS?

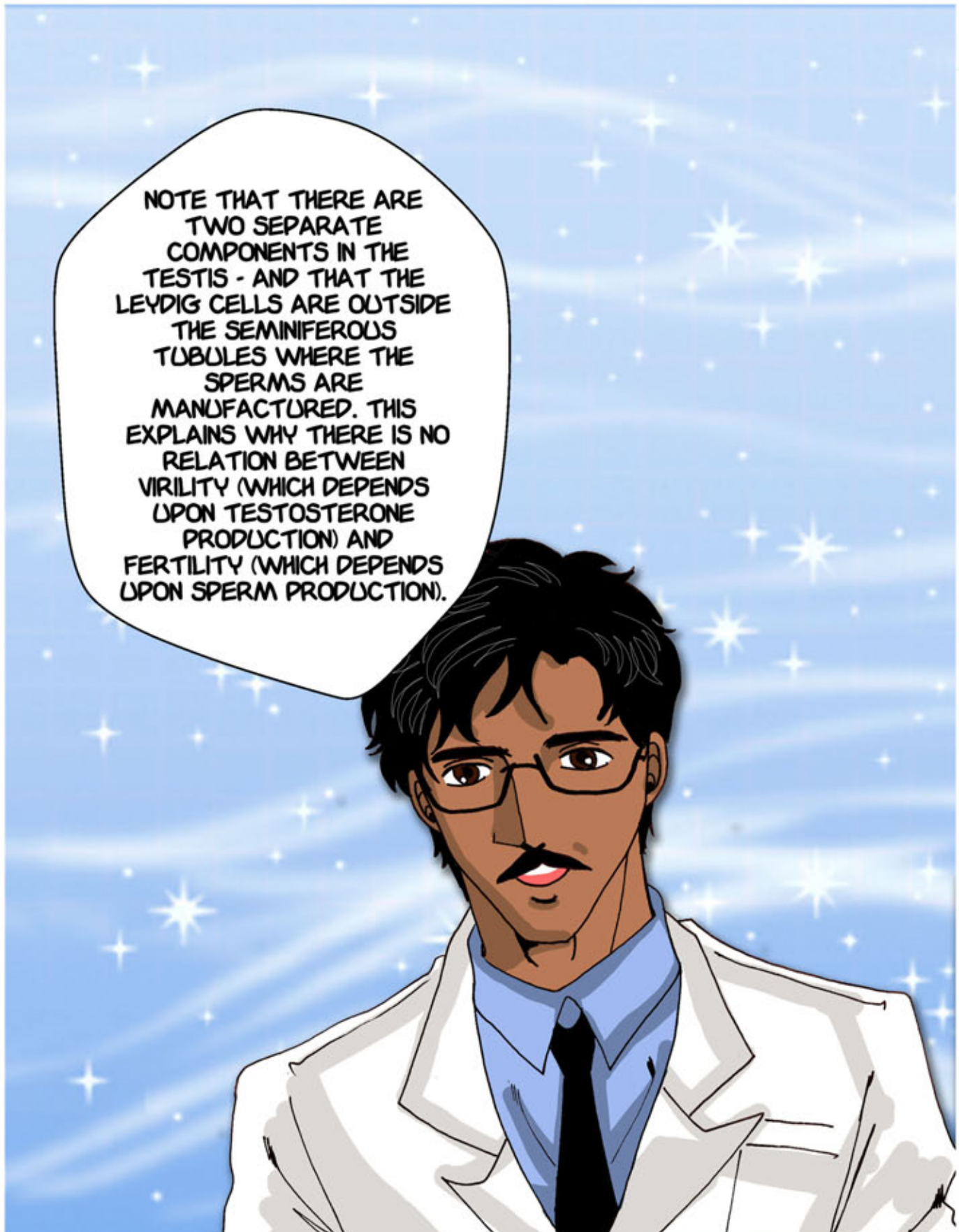
IF EJACULATION DOES NOT OCCUR FOR MANY DAYS, THE SPERMS IN THE REPRODUCTIVE DUCTS SIMPLY DIE. BUT MASTURBATION AND SEX CANNOT USE SPERM UP. THE BODY KEEPS MAKING SPERM AS LONG AS A MAN HAS EVEN ONE NORMAL TESTICLE.

HOW DOES
TESTOSTERONE
AFFECT MALE
FERTILITY?

TESTOSTERONE IS
PRODUCED BY
SPECIALIZED CELLS IN THE
TESTIS CALLED THE
LEYDIG CELLS. THESE ARE
STIMULATED TO RELEASE
TESTOSTERONE IN
RESPONSE TO THE LH
SIGNAL FROM THE
PITUITARY. LH IS
LUTEINIZING HORMONE -
THE SAME HORMONE
FOUND IN WOMEN.



IN ADDITION TO TESTOSTERONE, THE
PRODUCTION AND MATURATION OF
SPERM IN THE SEMINIFEROUS TUBULES
OF THE TESTIS IS STIMULATED BY FSH
PRODUCED BY THE PITUITARY GLAND -
AND THIS FSH IS IDENTICAL TO THAT
FOUND IN WOMEN. FSH ACTS ON THE
SERTOLI CELLS TO CAUSE THEM TO
SECRETE ANDROGEN-BINDING PROTEIN,
WHICH BINDS TESTOSTERONE AND
FACILITATES ITS ACTION ON SPERM
PRODUCTION. THE SERTOLI CELLS ALSO
PRODUCE GROWTH FACTORS SUCH AS
SGF(SEMINIFEROUS GROWTH FACTOR)
WHICH HELP TO REGULATE
SPERMATOGENESIS





TESTOSTERONE DOES MORE THAN JUST ALLOW MEN TO MAKE SPERM. IT ALSO TRIGGERS THE GROWTH OF FACIAL HAIR, THE DEEPENING OF MEN'S VOICES, AND THE DEVELOPMENT OF A MALE PHYSIQUE - ALL THE CHANGES WHICH MAKE BOYS INTO MEN. TESTOSTERONE IS ALSO IMPORTANT IN CREATING DESIRE FOR SEX IT INCREASES LIBIDO.

WHAT HAPPENS TO THE SPERM ONCE THEY ENTER A WOMAN'S VAGINA?

WHEN A MAN AND WOMAN HAVE SEXUAL INTERCOURSE, THE MAN PLACES HIS ERECT PENIS INSIDE THE WOMAN'S VAGINA. MILLIONS OF SPERM ARE RELEASED HERE WHEN EJACULATION OCCURS.





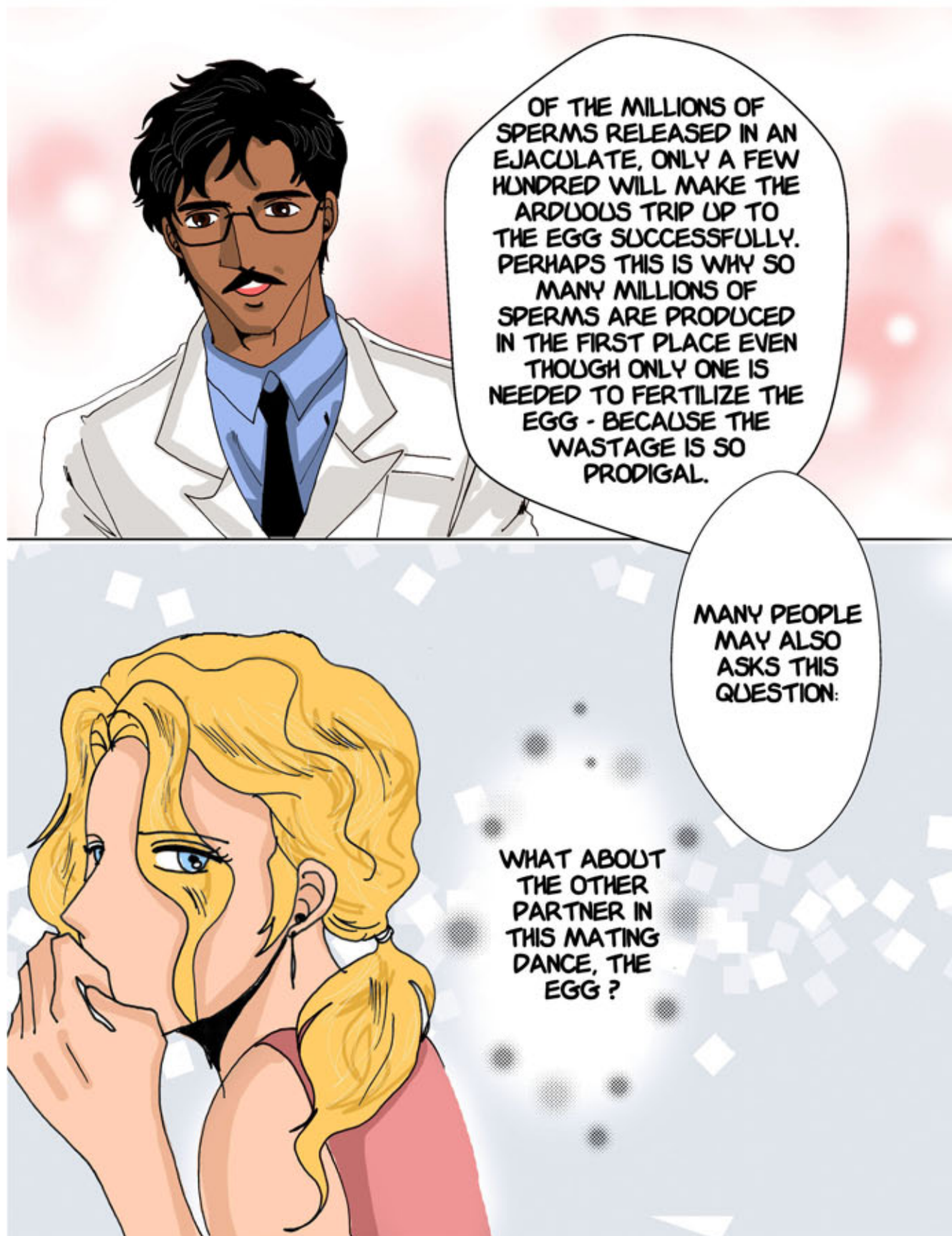
ONCE THE SPERM HAVE BEEN DEPOSITED HERE THEY HAVE A LONG AND ARDUOUS JOURNEY AHEAD OF THEM, LIKE SALMON ENTERING THE MOUTH OF A RIVER TO SWIM UPSTREAM TO SPAWN.

SOME OF THE SPERM SWIM STRAIGHT UP INTO THE FALLOPIAN TUBES THROUGH THE CERVIX AND UTERUS - AND SOME OF THEM ARE SO FAST, THAT SPERMS HAVE BEEN FOUND IN THE TUBES IN AS LITTLE AS A FEW MINUTES AFTER EJACULATION.



MANY SPERMS DIE IN THE ACIDIC VAGINAL FLUID; AND SOME ENTER THE CERVICAL MUCUS AND CERVICAL CRYPTS. THEY ARE SAFE HERE AND CAN REMAIN ALIVE HERE FOR AS LONG AS 48 TO 72 HOURS.

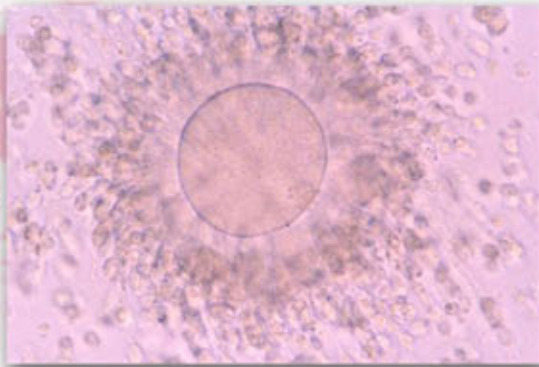




REMEMBER
THAT A MATURE
EGG IS
RELEASED FROM
THE OVARY (THIS
PROCESS IS
CALLED
OVULATION) ONLY
ONCE DURING
THE MENSTRUAL
CYCLE. THIS IS
THE "FERTILE
TIME", DURING
WHICH A
PREGNANCY CAN
OCCUR.



WHEN OVULATION OCCURS, THE
MATURE EGG IS RELEASED FROM
THE FOLLICLE IN THE OVARY. THIS
PROCESS OF FOLLICULAR RUPTURE
LOOKS A BIT LIKE A SMALL
VOLCANO ERUPTING ON THE
OVARIAN SURFACE. AT THIS TIME,
THE TUBAL FIMBRIA, LIKE
TENTACLES, SWEEP OVER THE
SURFACE OF THE OVARY, AND
ACTUALLY "SWALLOW" THE EGG.



THE EGG IS SURROUNDED BY A CLEAR SHELL CALLED THE ZONA PELLUCIDA. IT IS SURROUNDED BY A CLUSTER OF NEST CELLS CALLED THE CORONA CELLS WHICH SERVE TO NURTURE THE EGG. THEY FORM THE CUMULUS OOPHORUS WHICH IS A STICKY GEL WHICH PROTECTS THE EGG AND ALSO HELPS THE BEATING OF THE HAIR-LIKE CILIA OF THE FALLOPIAN TUBE TO PROPEL THE EGG TOWARDS THE UTERUS - LIKE A CONVEYOR-BELT.

THE EGG MUST NOW WAIT IN THE PROTECTIVE CONFINES OF THE FALLOPIAN TUBE, FOR A SPERM TO SWIM UP AND REACH IT. AN EGG REMAINS ALIVE FOR ABOUT 24 HOURS, AND IF FERTILIZATION DOES NOT OCCUR, IT DIES.



OF THE FEW HUNDRED SPERM WHICH REACH THE EGG, ONLY ONE WILL SUCCESSFULLY FERTILIZE IT. THE PROCESS OF FERTILIZATION IS TRULY THE PRIMEVAL MATING DANCE - THE FERTILIZATION TANGO - WHEN THE MOTHER'S CHROMOSOMES (IN THE EGG) AND THE FATHER'S CHROMOSOMES (IN THE SPERM) FUSE TOGETHER TO CREATE A NEW LIFE - ONE WHICH IS TOTALLY DIFFERENT FROM ALL OTHERS, BECAUSE OF ITS UNIQUE GENETIC COMPOSITION



CAPACITATION:

- A PROCESS DURING THE TIME THE SPERM SPEND IN THE FEMALE REPRODUCTIVE TRACT, WHILE SWIMMING TOWARDS THE EGG, THEY ACQUIRE THE CAPACITY TO FERTILIZE IT



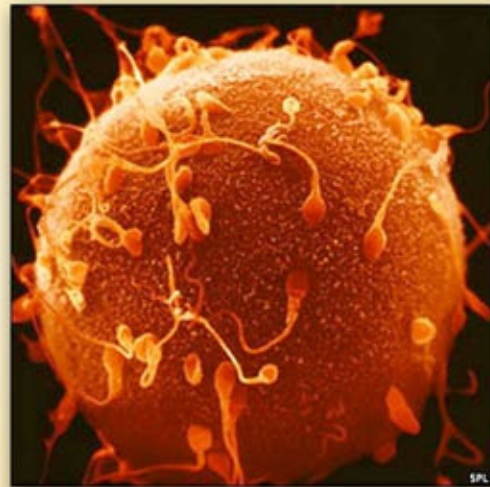
WHEN THE SPERMS REACH THE CORONA CELLS THEY BECOME HYPERACTIVATED - THEY START BEATING THEIR TAILS IN A FRENZY.



THIS IS USEFUL BECAUSE IT PROVIDES THE MECHANICAL ENERGY THE SPERM HEAD NEEDS TO BURROW ITS WAY THROUGH THE OUTER SHELL OF THE EGG CALLED THE ZONA.



THE SPERMS DISPERSE THE CUMULUS OOPHORUS (AND SO FAR IT'S A TEAM EFFORT) AND WHEN THEY REACH THE EGG, THEY FIRST BIND TO THE ZONA. A CHEMICAL IS RELEASED HERE BY THE SPERMS IN A PROCESS CALLED THE ACROSOMAL REACTION .



THE ACROSOMAL ENZYMES DISSOLVE THE ZONA PELLUCIDA BY MAKING A TINY HOLE IN IT, SO THAT ONE SPERM CAN SWIM THROUGH AND REACH THE SURFACE OF THE EGG. WHEN THIS HAPPENS , THE EGG TRANSFORMS ITS CELL MEMBRANE INTO AN IMPENETRABLE BARRIER, THUS PREVENTING OTHER SPERM FROM ENTERING IT. ONCE ONE SPERM IS THE WINNER, ALL THE OTHER SPERM ARE LOCKED OUT!

THE GENETIC MATERIAL OF THE SPERM (THE MALE PRONUCLEUS) AND THE GENETIC MATERIAL OF THE EGG (THE FEMALE PRONUCLEUS) THEN FUSE - TO FORM AN EMBRYO. A NEW LIFE HAS NOW BEGUN, WITH A UNIQUE DNA SIGNATURE. THIS SINGLE CELL THEN DIVIDES INTO 2 CELLS.

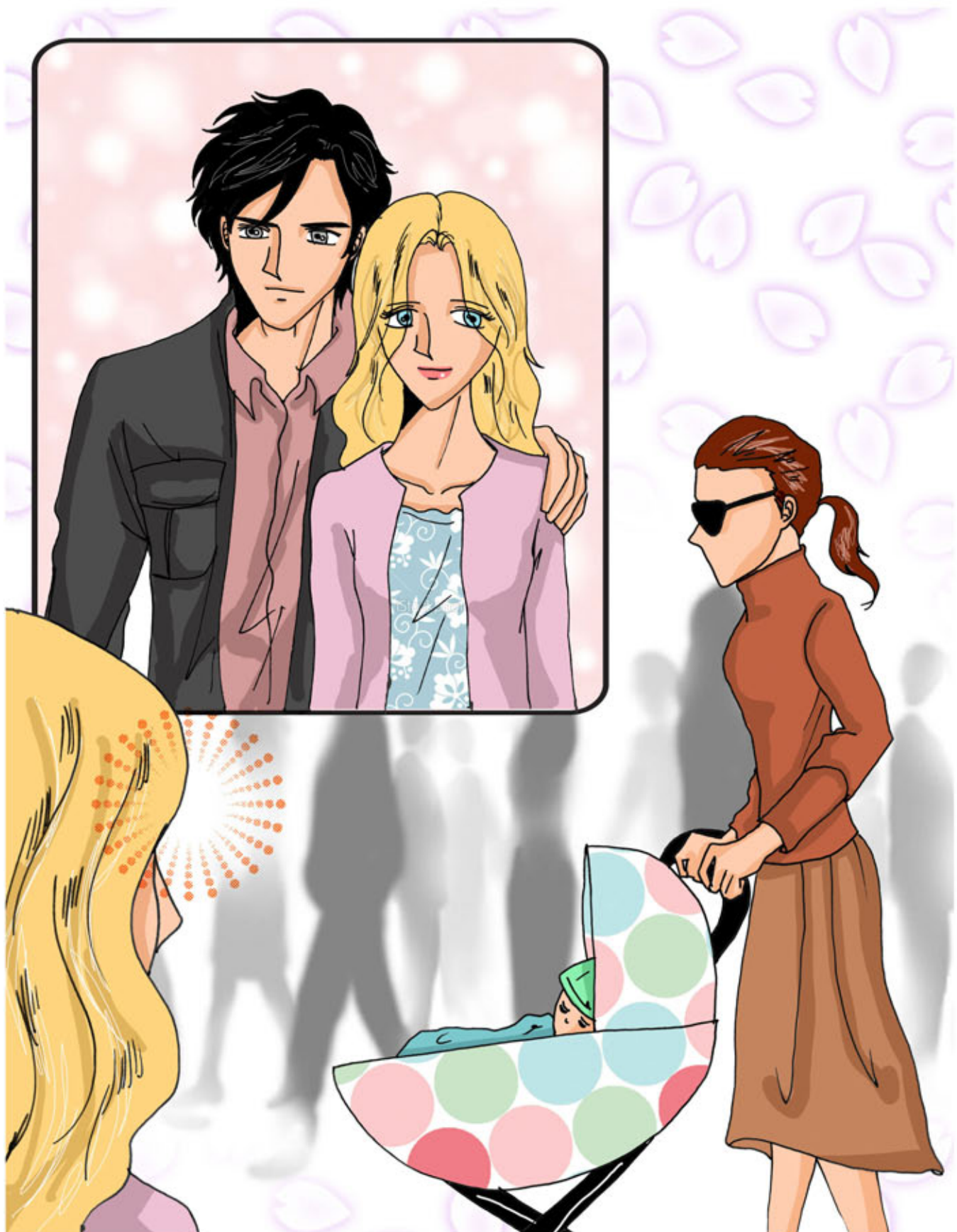


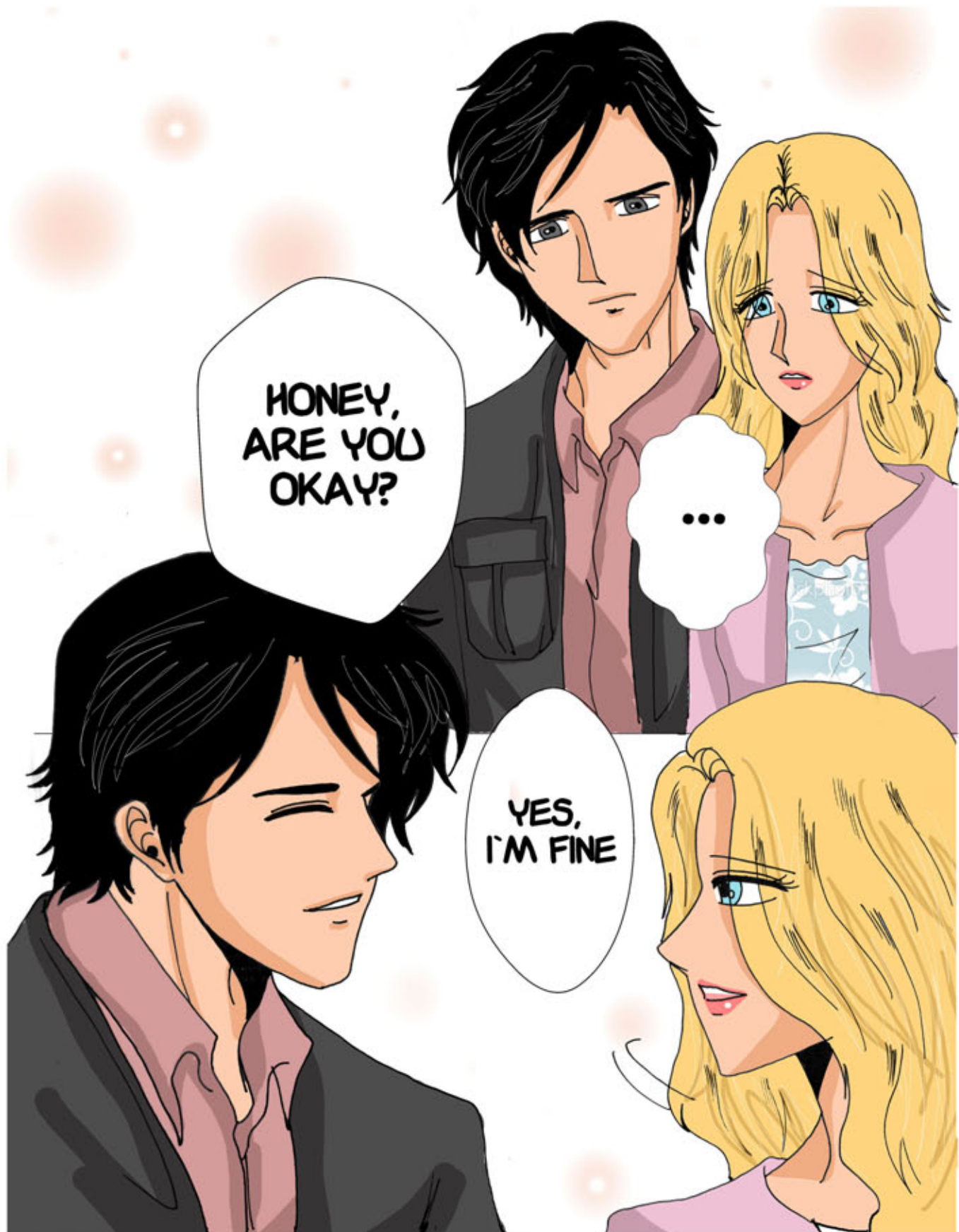


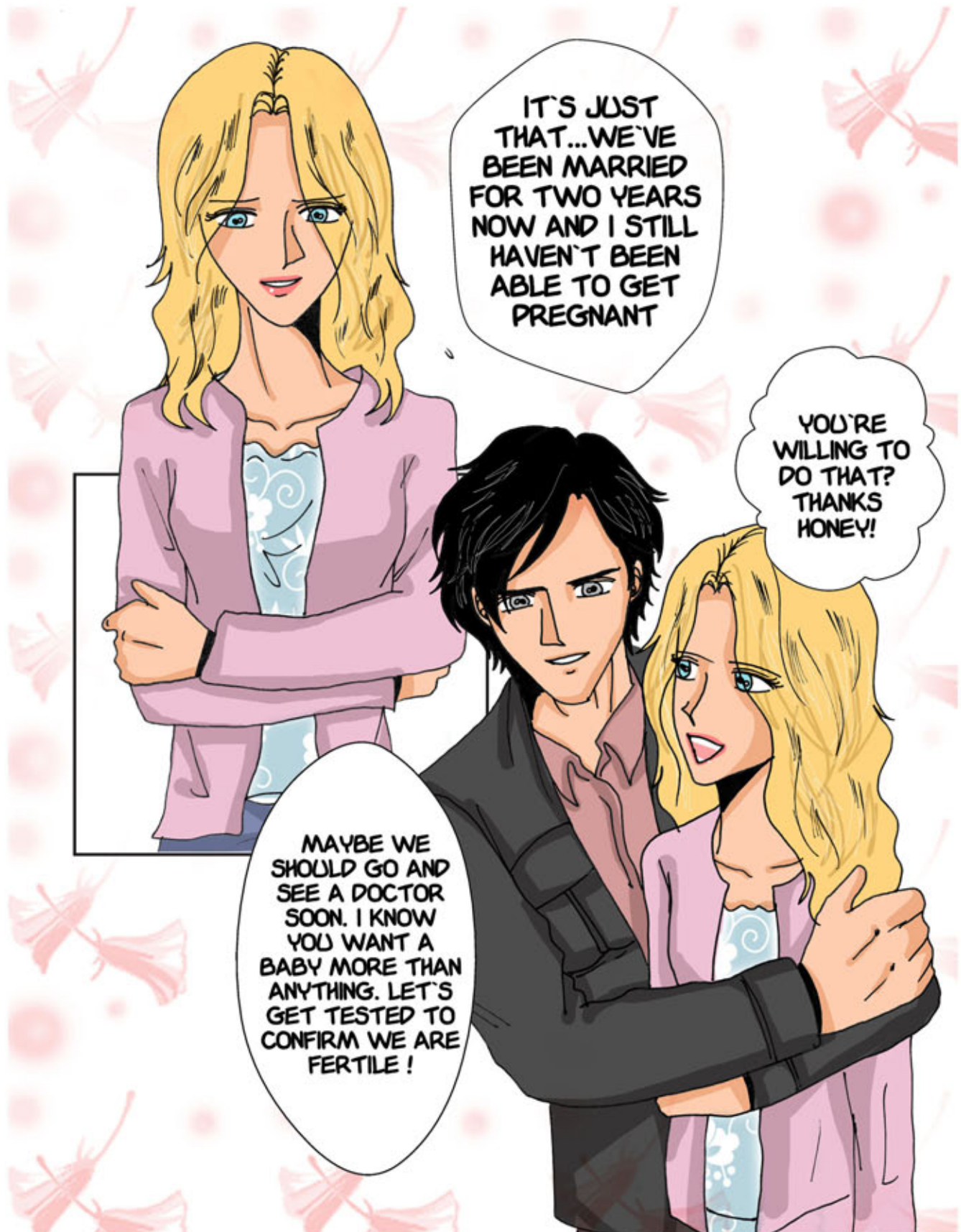
THESE CELLS IN TURN THEN CONTINUE TO DIVIDE RAPIDLY DURING THEIR PASSAGE THROUGH THE FALLOPIAN TUBE (WHICH NURTURES IT AND PROPELS IT) INTO THE UTERUS . THIS JOURNEY TAKES ABOUT 3 TO 5 DAYS. BY THE TIME THE EMBRYO REACHES THE UTERUS, IS HAS BECOME A BALL OF OVER 100 CELLS CALLED A BLASTOCYST.

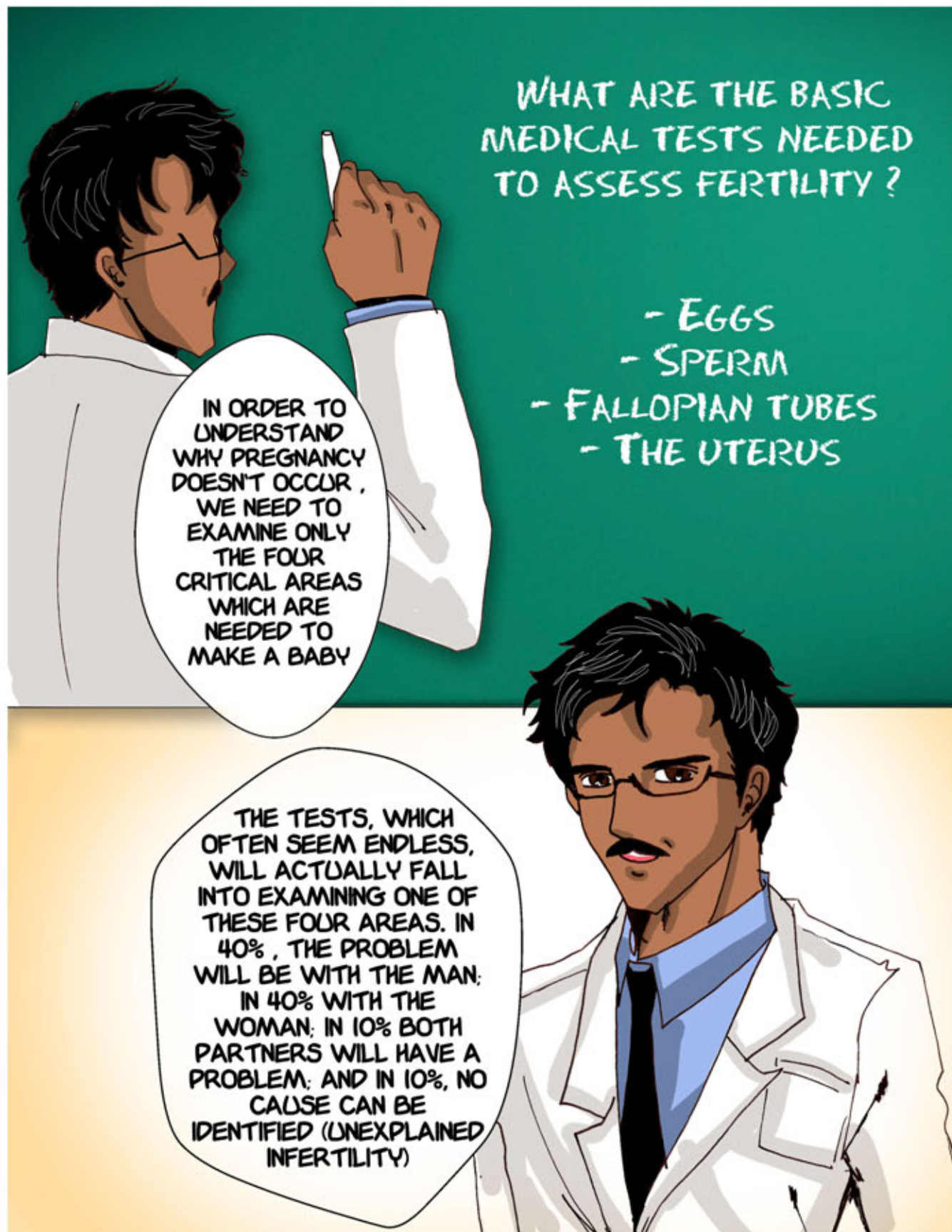
THE EMBRYO MUST THEN BREAK THROUGH ITS ZONA(THIS IS CALLED EMBRYO HATCHING); AND THEN ATTACH ITSELF TO THE LINING OF THE UTERUS IN A PROCESS CALLED IMPLANTATION - AND IN 9 MONTHS , IF ALL GOES WELL, A BABY IS BORN!













BEFORE STARTING WITH TESTS, THE DOCTOR TAKES A DETAILED MEDICAL HISTORY FROM THE COUPLE, AND ALSO PERFORMS A PHYSICAL EXAMINATION FOR BOTH OF THEM, TO DETERMINE IF THIS CAN PROVIDE CLUES AS TO THE CAUSE OF THE PROBLEM. THE DOCTOR WILL NEED TO FIND OUT DETAILS ABOUT YOUR MENSTRUAL CYCLE, AS WELL AS YOUR SEXUAL HABITS AND PAST HISTORY OF SURGERY OR ILLNESS, SO YOU SHOULD BE PREPARED TO ANSWER THESE QUESTIONS.

MANY CLINICS GIVE PATIENTS A FORM TO FILL OUT, SO THAT THEY CAN PROVIDE ALL THIS INFORMATION. A PHYSICAL EXAMINATION CAN ALSO PROVIDE THE DOCTOR WITH USEFUL INFORMATION, AND HE WILL LOOK SPECIFICALLY FOR IMPORTANT CLINICAL FINDINGS SUCH AS ABNORMAL HAIR GROWTH, EXCESSIVELY OILY SKIN, OR THE PRESENCE OF A MILKY DISCHARGE FROM THE BREAST.



HOW ARE THESE BASIC INFERTILITY TESTS DONE ?

FOR MOST COUPLES, INVESTIGATIONS ARE NEEDED TO ESTABLISH A DIAGNOSIS. THESE SPECIALIZED TESTS CONSTITUTE THE INFERTILITY WORKUP AND THEY CAN BE COMPLETED EFFICIENTLY IN ONE MONTH . TIMING THE PROCEDURES PROPERLY DURING THE MENSTRUAL CYCLE IS IMPORTANT.



THE COUPLE MUST BE SEEN TOGETHER AND THE FIRST TEST WHICH SHOULD BE DONE IS A SEMEN ANALYSIS BECAUSE THIS IS A SIMPLE AND INEXPENSIVE TEST.





THE DAY THE BLEEDING STARTS IS CALLED DAY 1, AND THE SEMEN ANALYSIS TO CHECK THE HUSBAND'S SPERM COUNT AND MOTILITY CAN BE DONE ON DAY 3-4, AFTER REQUESTING HIM TO ABSTAIN FROM EJACULATION FOR AT LEAST 3 DAYS.

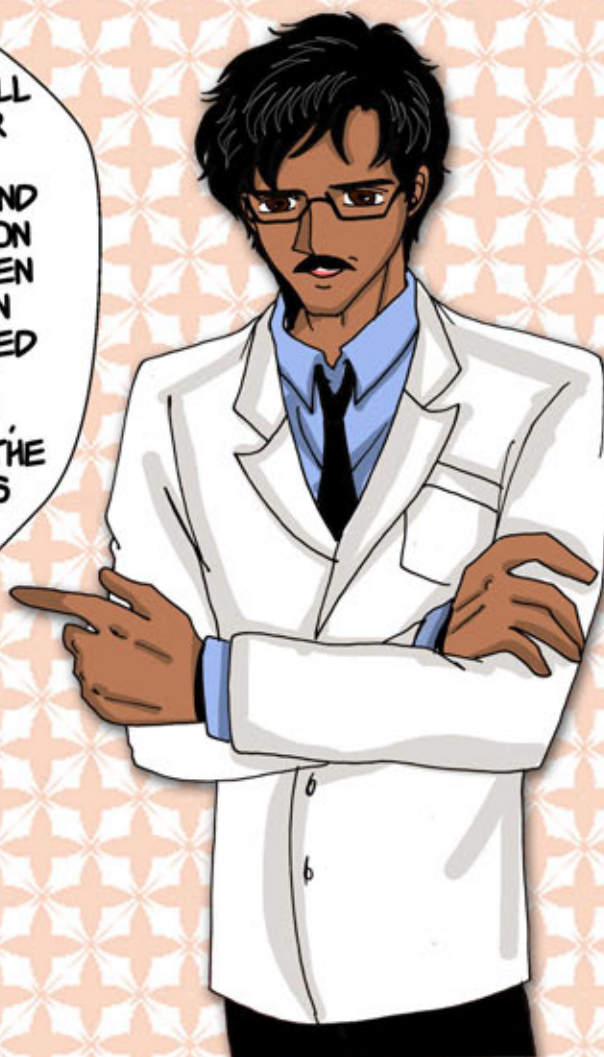
THE WIFE'S BLOOD IS THEN TESTED FOR MEASURING THE LEVELS OF FOUR KEY REPRODUCTIVE HORMONES: PROLACTIN, LH (LUTEINING HORMONE) , FSH (FOLLICLE STIMULATING HORMONE) , TSH (THYROID STIMULATING HORMONE) AND AMH (ANTI MULLERIAN HORMONE) . THESE SHOULD BE DONE BETWEEN DAY 3-5 OF THE CYCLE.



WE THEN DO A HYSTEROSALPINGOGRAM (AN X-RAY OF THE UTERUS AND TUBES) AFTER THE MENSTRUAL BLEEDING HAS STOPPED - BETWEEN DAY 5-7, TO CONFIRM HER UTERUS AND TUBES ARE NORMAL. . THESE THREE BASIC TESTS ALLOW US TO CHECK WHETHER THE EGGS, SPERM, UTERUS AND TUBES ARE NORMAL.

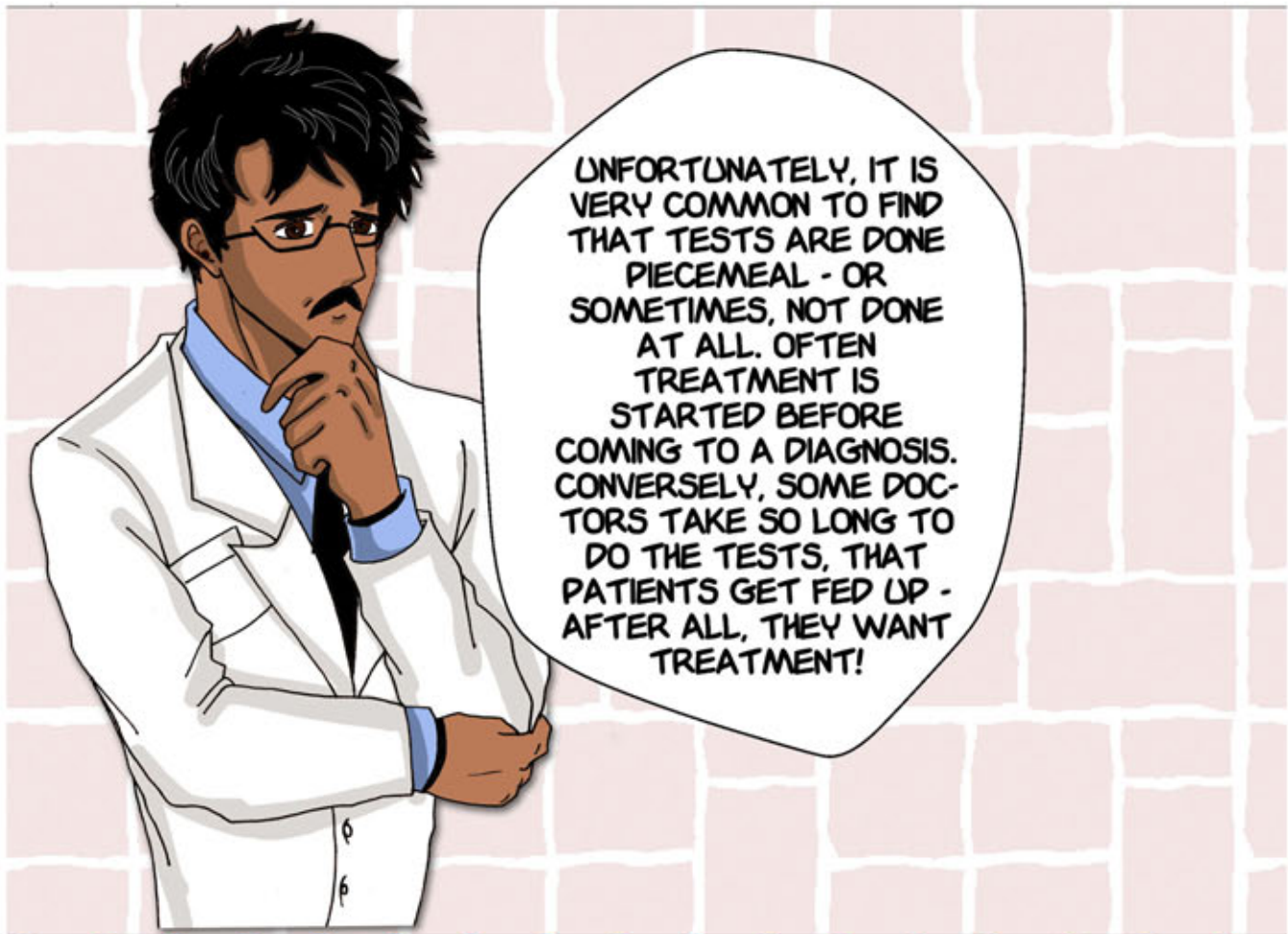


SOME DOCTORS WILL PERFORM FURTHER TESTING. THESE INCLUDE: ULTRASOUND SCANS FOR OVULATION MONITORING BETWEEN DAY 11-16. THE SCAN RESULTS CAN BE USED FOR TIMING A PCT (POSTCOITAL TEST), DURING WHICH TIME THE CERVICAL MUCUS IS ASSESSED ALSO



A SERUM PROGESTERONE LEVEL CAN BE MEASURED ON DAY 21, ABOUT 7 DAYS AFTER OVULATION. THIS PROVIDES INFORMATION ABOUT THE QUALITY OF OVULATION. SOME DOCTORS ALSO DO A LAPAROSCOPY IN THE SAME MONTH (DAY 20-25); AND COMBINE IT WITH AN ENDOMETRIAL BIOPSY, IF DESIRED.

WITH THIS STRATEGY, TIME IS NOT WASTED, AND COUPLES CAN BE REASSURED THAT A POSSIBLE REASON FOR THE CAUSE OF THE INFERTILITY, IF IT EXISTS, WILL BE DETECTED WITHIN ONE MONTH.



THE WORKUP SHOULD NOT STOP WHEN A PROBLEM IS DISCOVERED - IT IS IMPORTANT TO COMPLETE THE TESTING, SINCE IT IS POSSIBLE THAT THERE MAYBE MULTIPLE PROBLEMS. SOME DISEASES, SUCH AS PELVIC INFLAMMATORY DISEASE (PID) ARE "SILENT", SO THAT THE PATIENT MAY HAVE ABSOLUTELY NO SIGNS OR SYMPTOMS.





SOMETIMES IT CAN BE DIFFICULT FOR PATIENTS TO COME TO TERMS WITH THE FACT THAT THERE IS A MAJOR PROBLEM WHICH PRESENTS A SIGNIFICANT HURDLE TO GETTING PREGNANT. THE TRUTH CAN BE BITTER, BUT IT'S FAR BETTER TO FACE UP TO IT AND DEAL WITH IT, RATHER THAN LIVE IN A FOOL'S PARADISE !

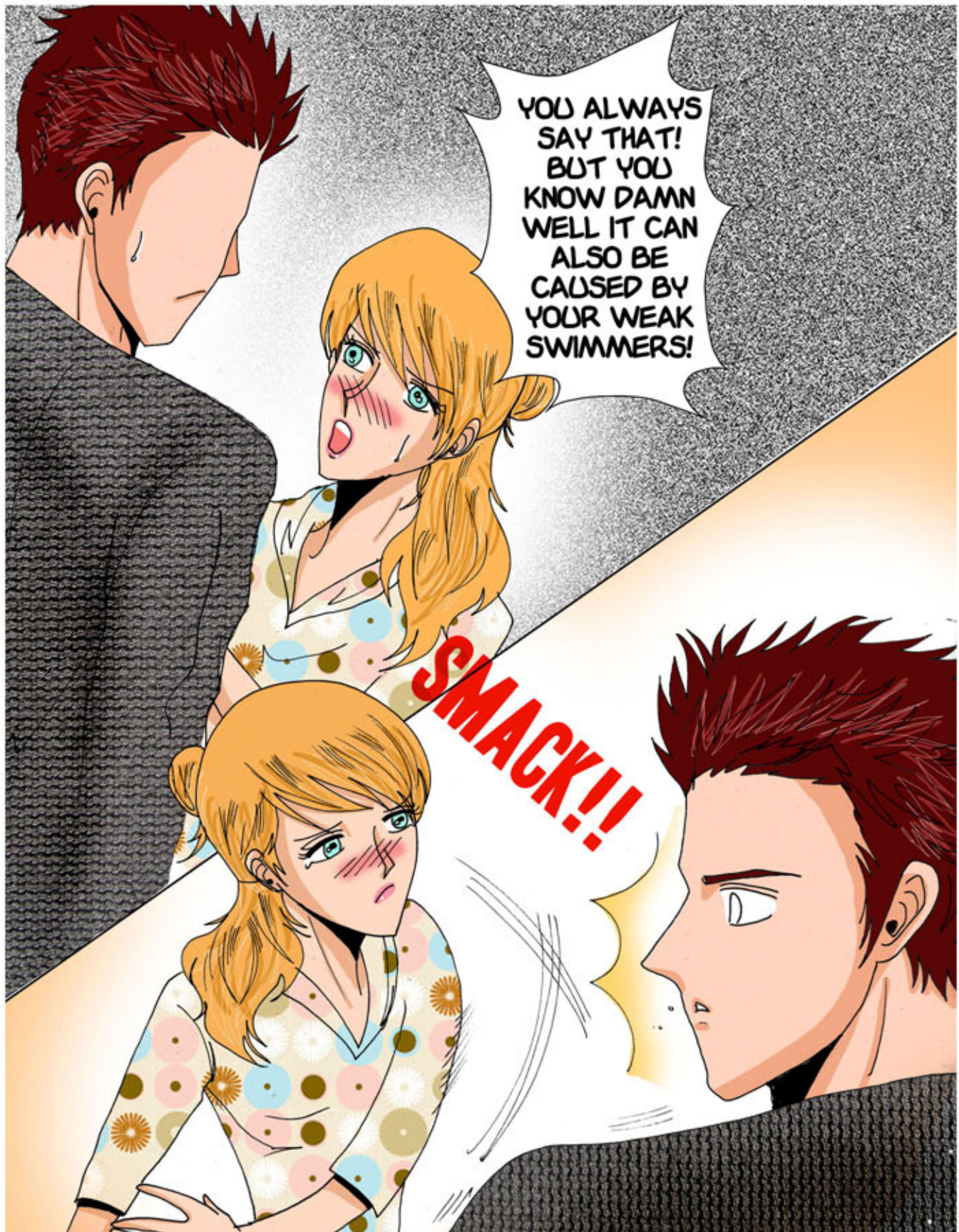
WITH TODAY'S ADVANCED REPRODUCTIVE TECHNOLOGY, WE CAN ALWAYS FIND A SOLUTION, NO MATTER WHAT THE PROBLEM BUT REMEMBER THAT UNLESS YOU CAN INTELLIGENTLY IDENTIFY THE PROBLEM, YOU CANNOT FIND A SOLUTION !

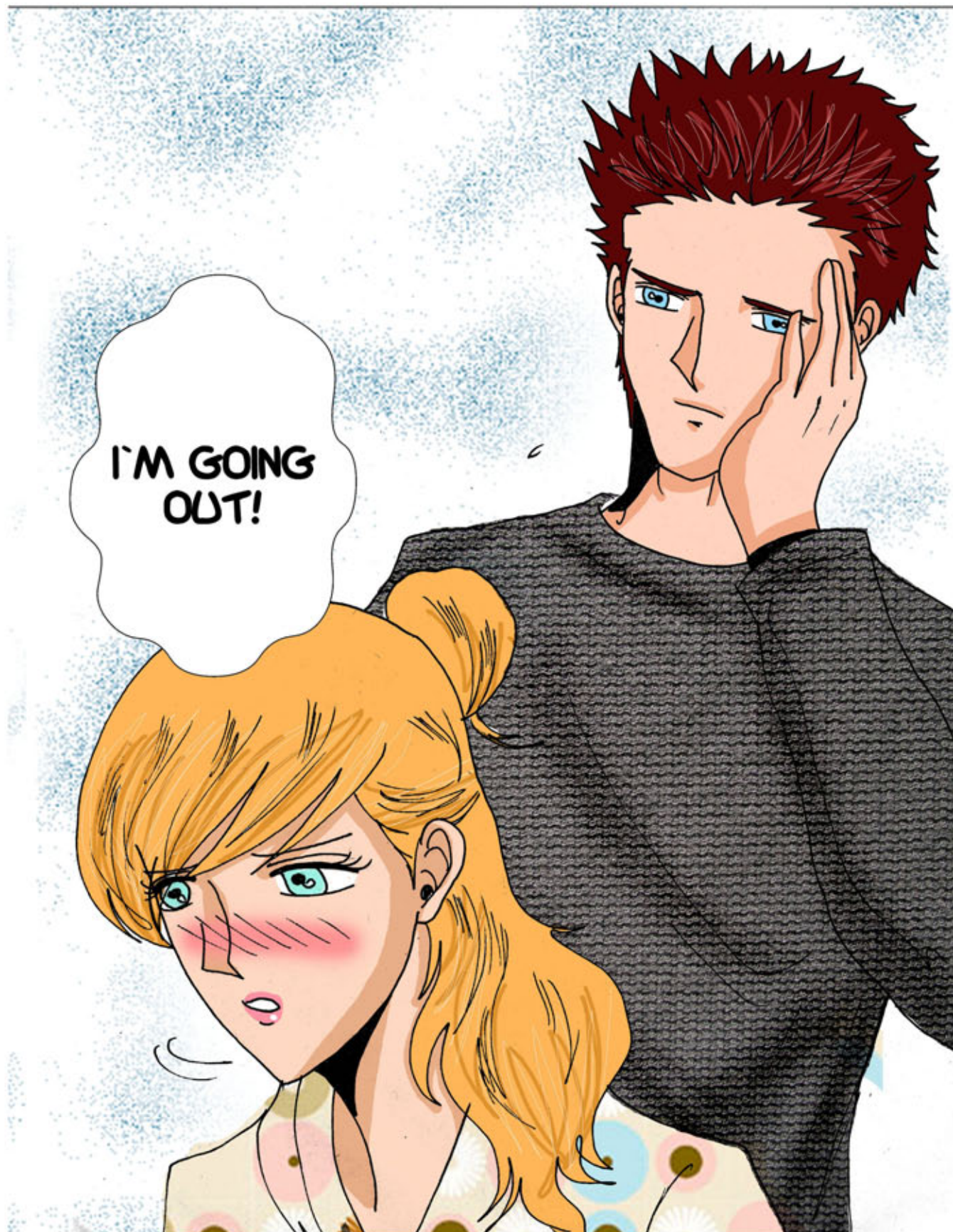


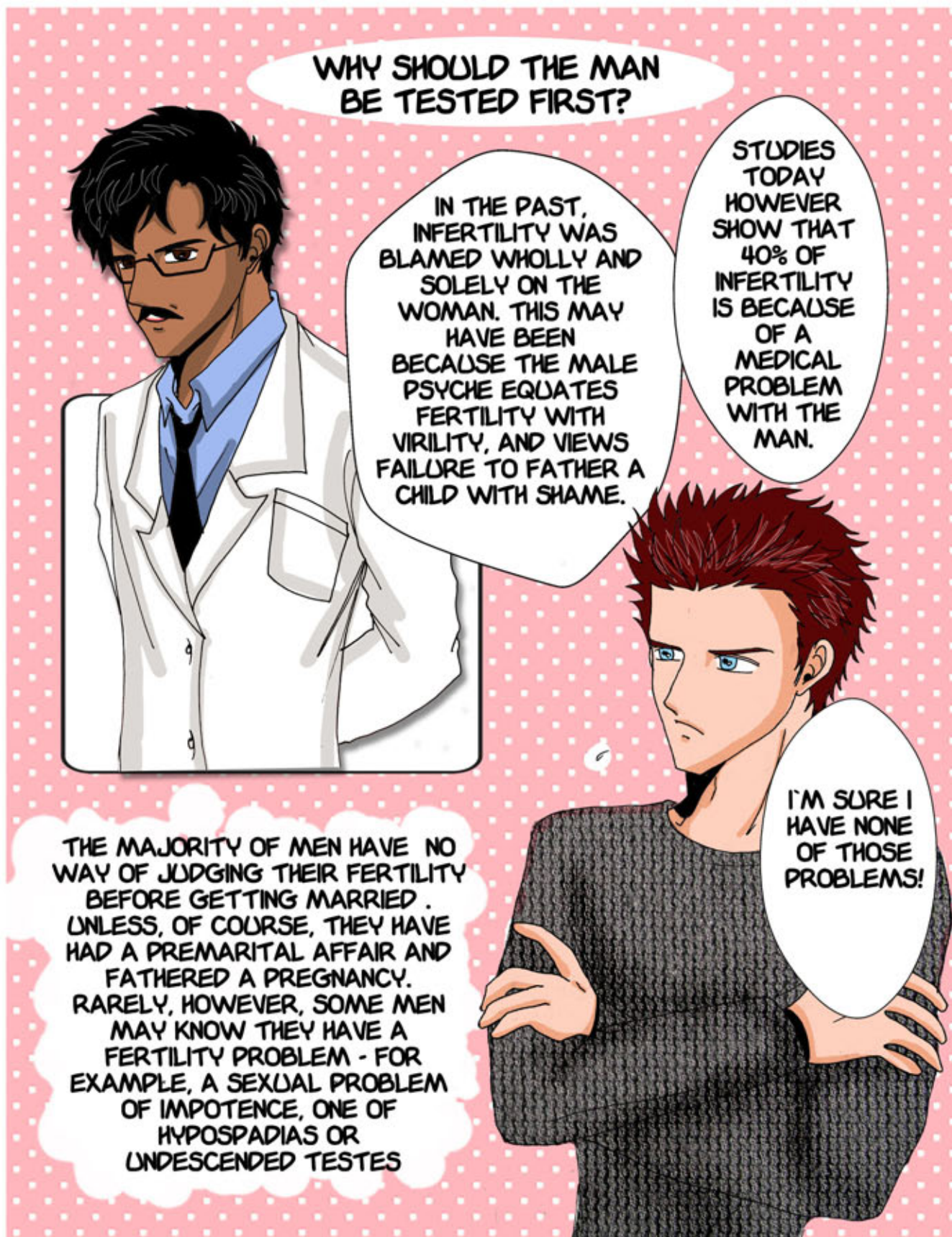
IT IS ONLY AFTER THE WORKUP HAS BEEN COMPLETED , THAT A TREATMENT PLAN CAN BE FORMULATED - AND YOU WILL NOW NEED TO MAKE DECISIONS ABOUT TREATMENT OPTIONS.

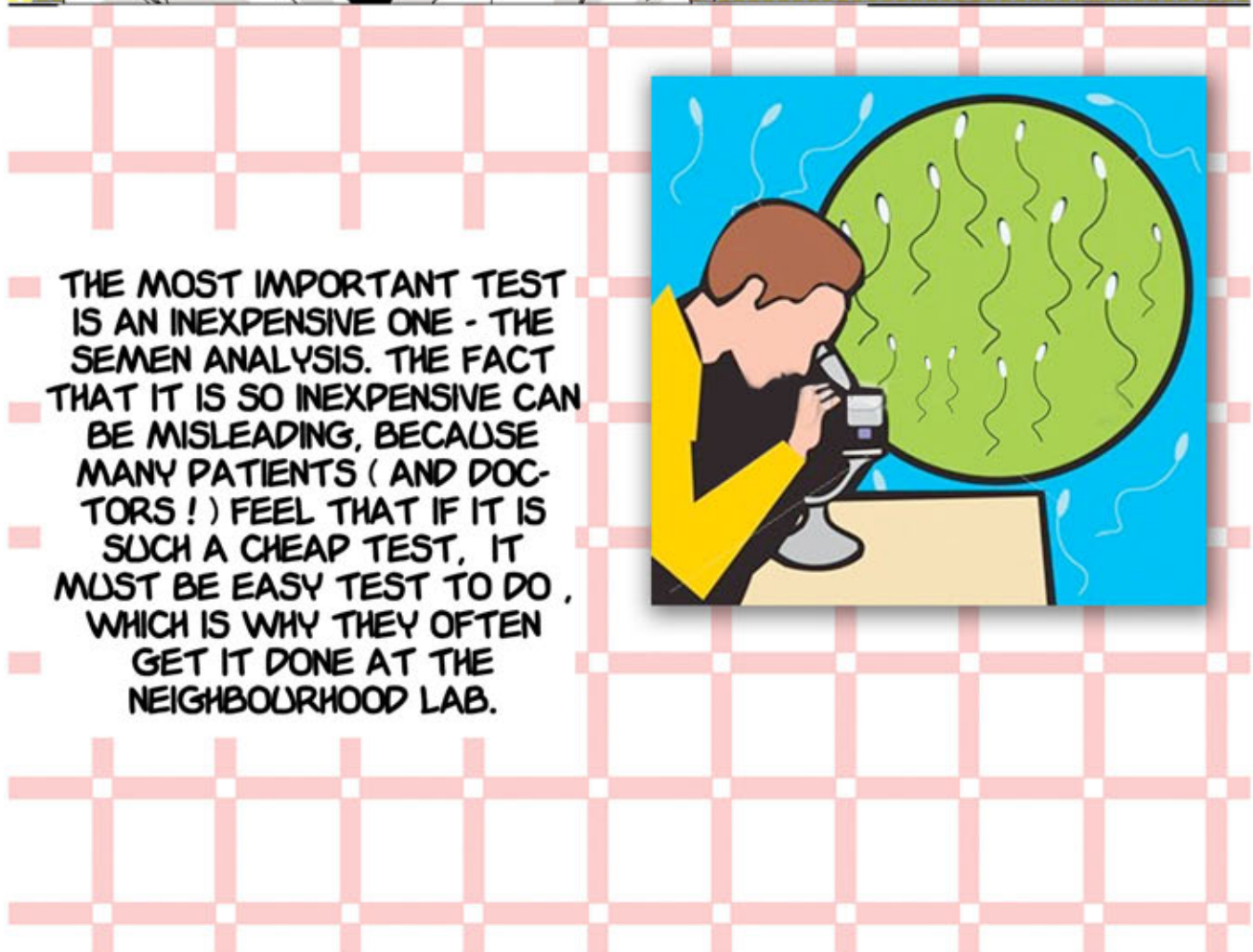
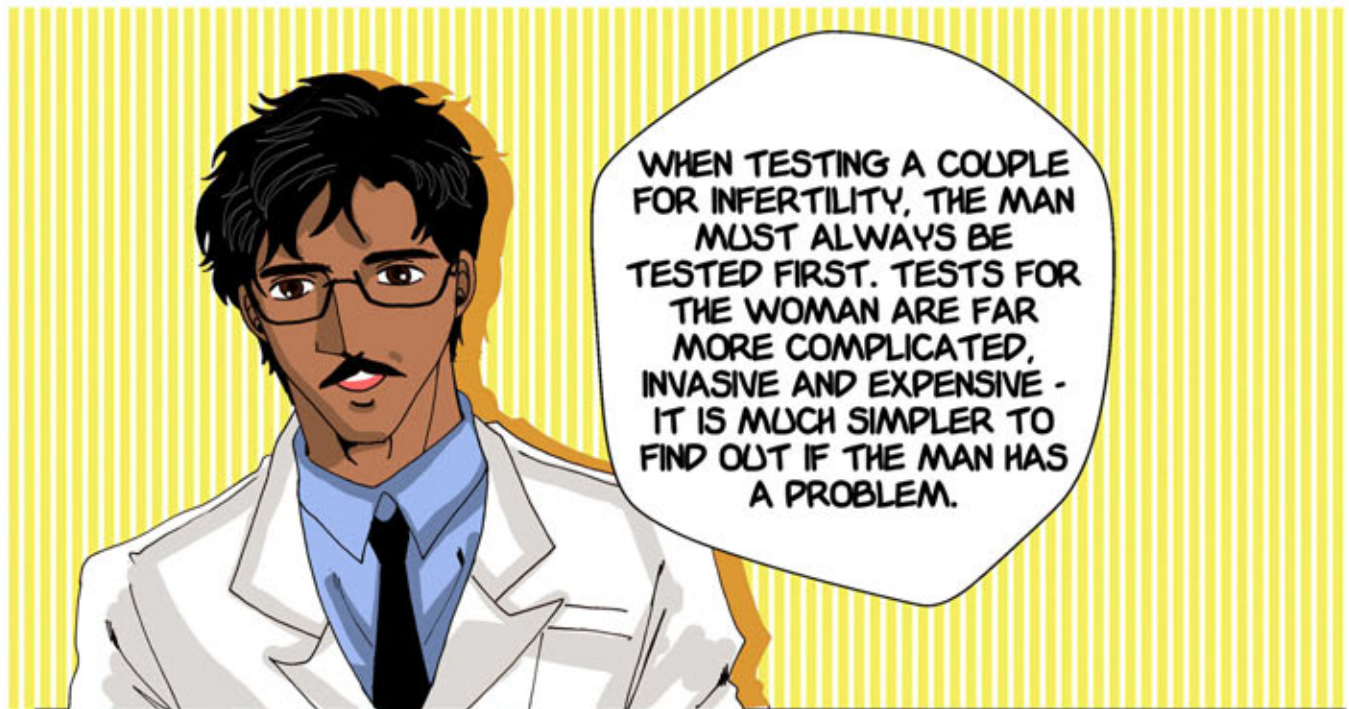














THIS IS WHY IT IS CRUCIAL TO GO TO A RELIABLE ANDROLOGY LABORATORY WHICH SPECIALISES IN SPERM TESTING FOR YOUR SEMEN ANALYSIS, SINCE THE REPORTING IS VERY SUBJECTIVE AND DEPENDS UPON THE SKILL OF THE TECHNICIAN IN THE LAB.

FOR A SEMEN ANALYSIS, A FRESH SEMEN SAMPLE, NOT MORE THAN HALF AN HOUR OLD IS NEEDED, AFTER SEXUAL ABSTINENCE FOR AT LEAST 2 TO 4 DAYS. THE MAN MASTURBATES INTO A CLEAN, WIDE MOUTHED BOTTLE WHICH IS THEN DELIVERED TO THE LABORATORY.





SOME MEN FIND IT STRESSFUL TO PROVIDE A SEMEN SAMPLE IN THE LABORATORY. THEY CAN ASK FOR HELP ! THEIR WIFE, A SEX MAGAZINE, A XXX FILM OR MECHANICAL VIBRATOR CAN BE USED TO HELP THEM GET AN ERECTION.

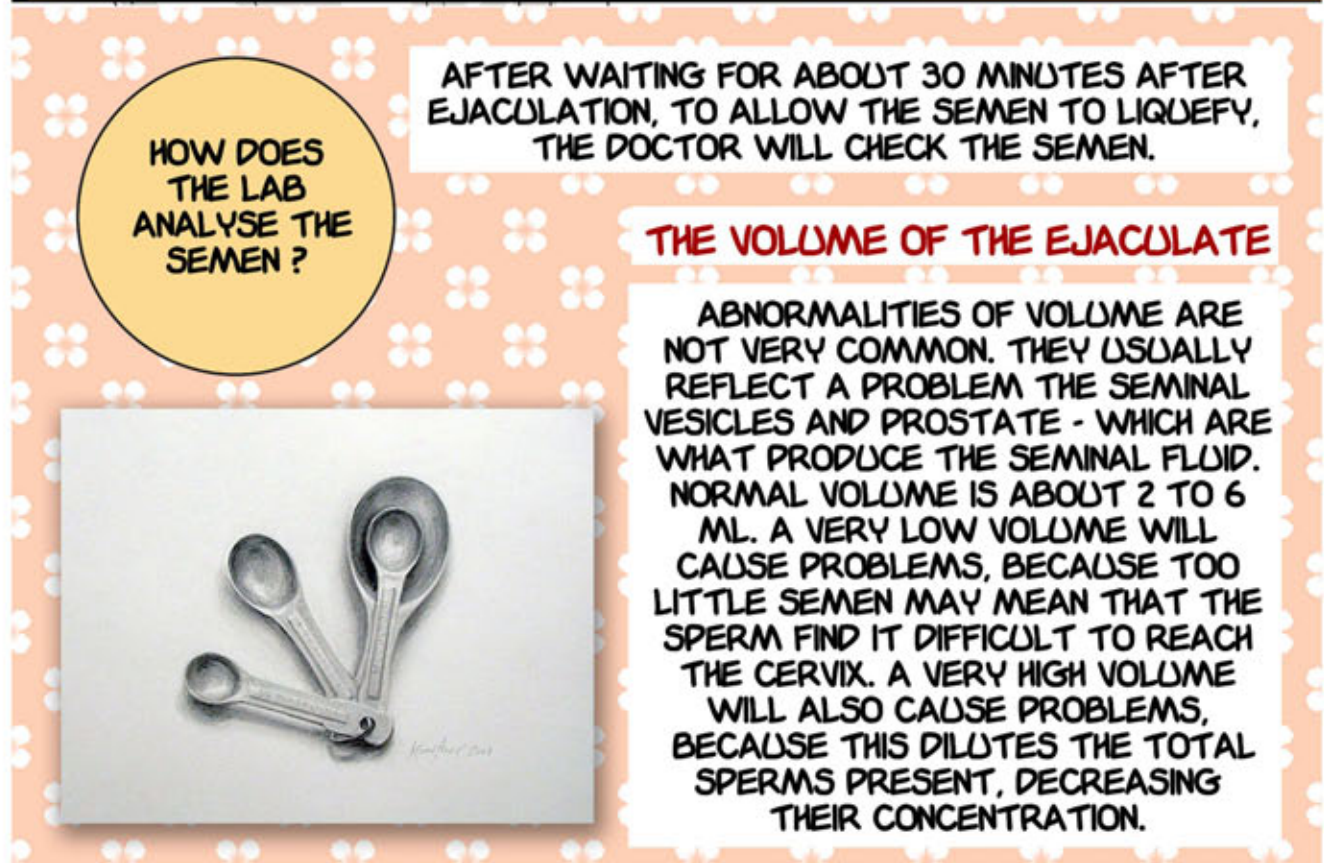
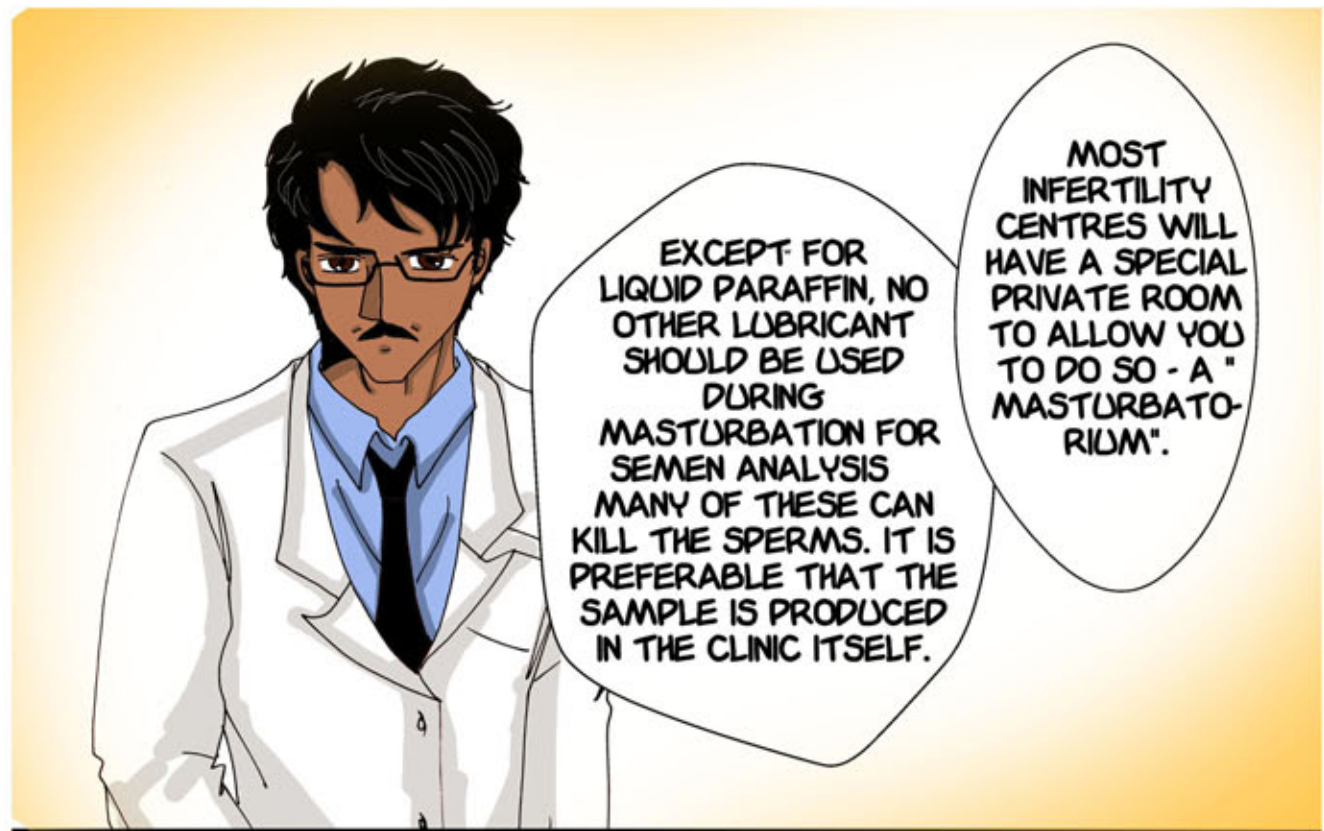


SOME MEN ALSO FIND IT HELPFUL TO USE LIQUID PARAFFIN TO PROVIDE LUBRICATION DURING MASTURBATION. FOR SOME MEN, USING VIAGRA CAN HELP THEM TO GET AN ERECTION. IF THE PROBLEM STILL PERSISTS, IT IS POSSIBLE TO COLLECT THE EJACULATE IN A SPECIAL SILICONE CONDOM (WHICH IS NON-TOXIC TO THE SPERM) DURING SEXUAL INTERCOURSE, AND THEN SEND THIS TO THE LABORATORY FOR TESTING. IF YOU WANT TO PRODUCE THE SEMEN SAMPLE AT HOME, THIS IS FINE, BUT PLEASE ENSURE THAT IT REACHES THE LABORATORY WITHIN 30-60 MINUTES.

THE SEMEN SAMPLE MUST BE KEPT AT ROOM TEMPERATURE, AND THE CONTAINER MUST BE SPOTLESSLY CLEAN. IF THE SAMPLE SPILLS OR LEAKS OUT, THE TEST IS INVALID AND NEEDS TO BE REPEATED.

BRR..
I'M
COLD!





DURING EJACULATION THE SEMEN SPURTS OUT AS A LIQUID WHICH GELS PROMPTLY. THIS SHOULD LIQUEFY AGAIN IN ABOUT 30 MINUTES TO ALLOW THE SPERM FREE MOTILITY. IF IT FAILS TO DO SO, OR IF IT IS VERY THICK IN CONSISTENCY EVEN AFTER LIQUEFACTION

THIS SUGGESTS A PROBLEM - MOST USUALLY ONE OF INFECTION OF THE SEMINAL VESICLES AND PROSTATE.

THE VISCOSITY



THE PH

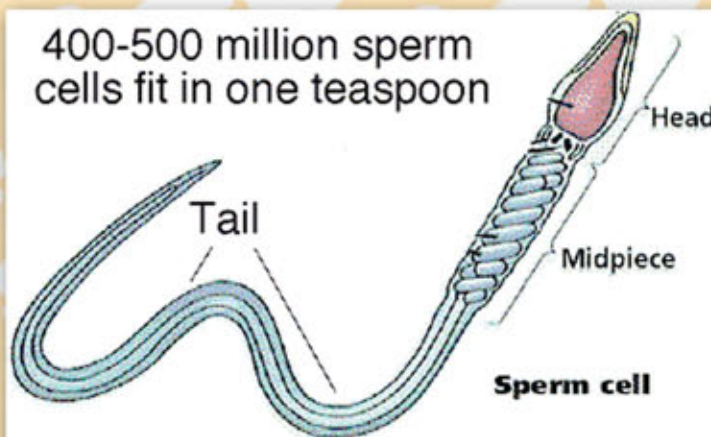
NORMALLY THE PH OF SEMEN IS ALKALINE. AN ALKALINE PH PROTECTS THE SPERMS FROM THE ACIDITY OF THE VAGINAL FLUID. AN ACIDIC PH SUGGESTS PROBLEMS WITH SEMINAL VESICLE FUNCTION - EITHER ABSENCE OF THE SEMINAL VESICLES, OR AN EJACULATORY DUCT OBSTRUCTION.

THE PRESENCE OF A SUGAR CALLED FRUCTOSE

THIS SUGAR IS PRODUCED BY THE
SEMINAL VESICLES AND PROVIDES
ENERGY FOR SPERM MOTILITY. ITS
ABSENCE SUGGESTS A BLOCK IN
THE MALE REPRODUCTIVE TRACT
AT THE LEVEL OF THE
EJACULATORY DUCT.



400-500 million sperm
cells fit in one teaspoon



SPERM DIAGRAM

WHAT DO SPERM LOOK LIKE ?

SPERM ARE MICROSCOPIC
CREATURES WHICH LOOK LIKE
TINY TADPOLES SWIMMING
ABOUT AT A FRANTIC PACE.





WHAT DOES THE LAB LOOK FOR WHEN TESTING YOUR SPERM ?



THE FIRST TEST IS YOUR SPERM COUNT TO SEE IF YOU HAVE ENOUGH SPERMS. IF THE SEMEN SAMPLE HAS LESS THAN 20 MILLION SPERM PER ML, THIS IS CONSIDERED TO BE A LOW SPERM COUNT. LESS THAN 10 MILLION IS VERY LOW. THE TECHNICAL TERM FOR THIS IS OLIGOSPERMIA

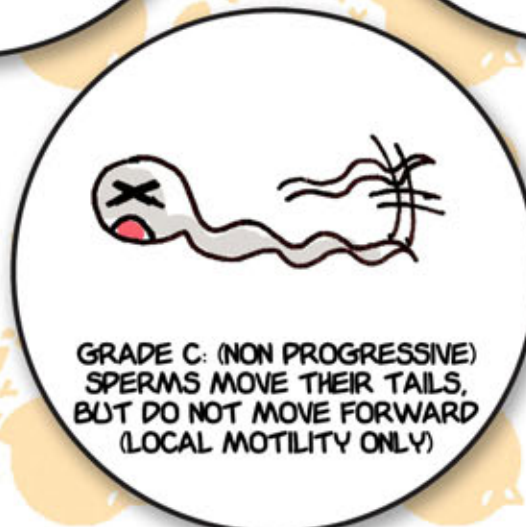
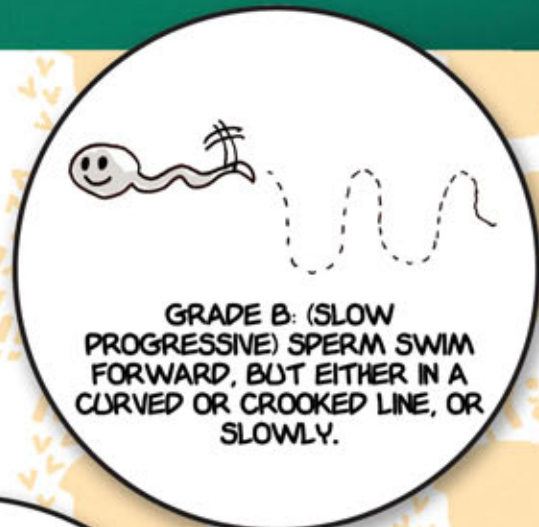
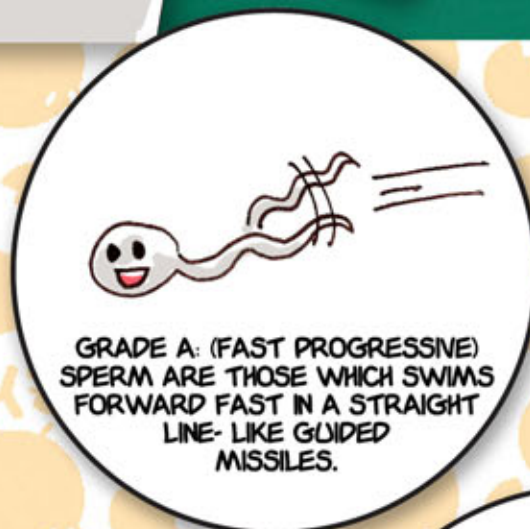
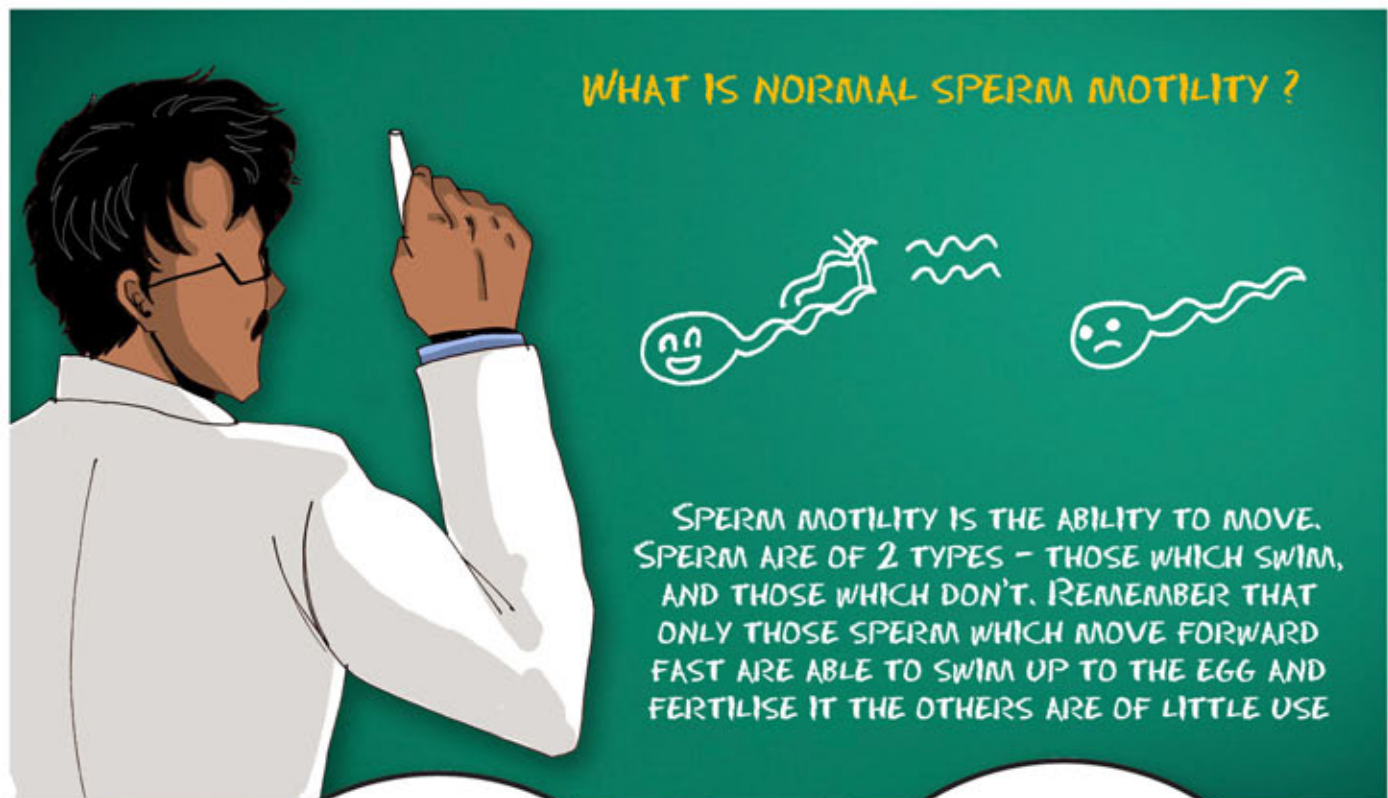
SOME MEN WILL HAVE NO SPERMS AT ALL AND ARE SAID TO BE AZOOSPERMIC.

WHAT??!!

THIS CAN COME AS A RUDE SHOCK BECAUSE THE SEMEN IN THESE PATIENTS LOOK ABSOLUTELY NORMAL - IT IS ONLY ON MICROSCOPIC EXAMINATION THAT THE PROBLEM IS DETECTED.

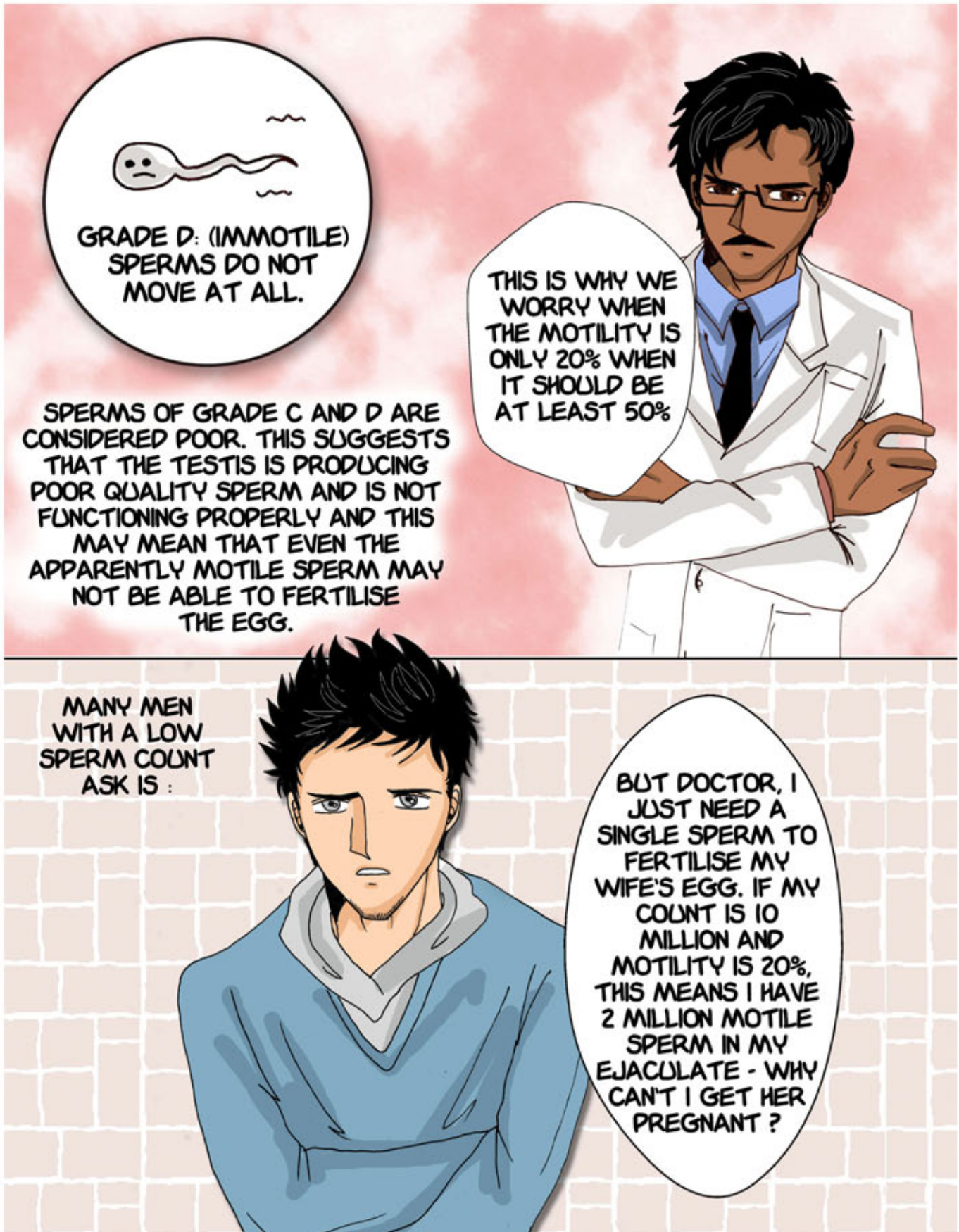
Ka-Boom!

YOU'RE AZOOSPERMIC



MOTILITY IS GRADED FROM A TO D, ACCORDING TO WORLD HEALTH ORGANIZATION (WHO) CRITERIA.



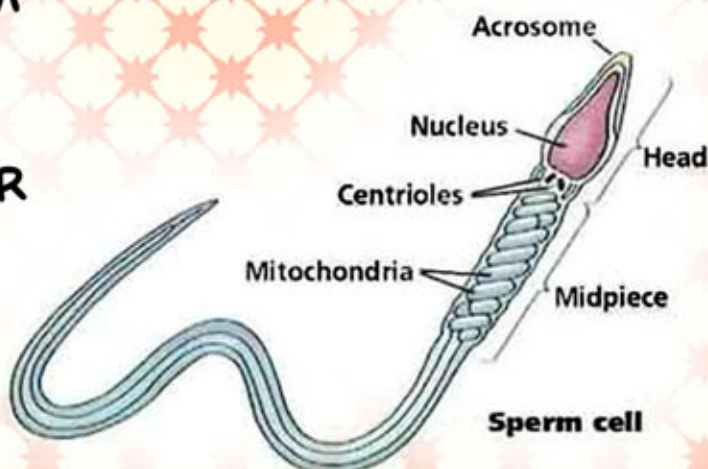




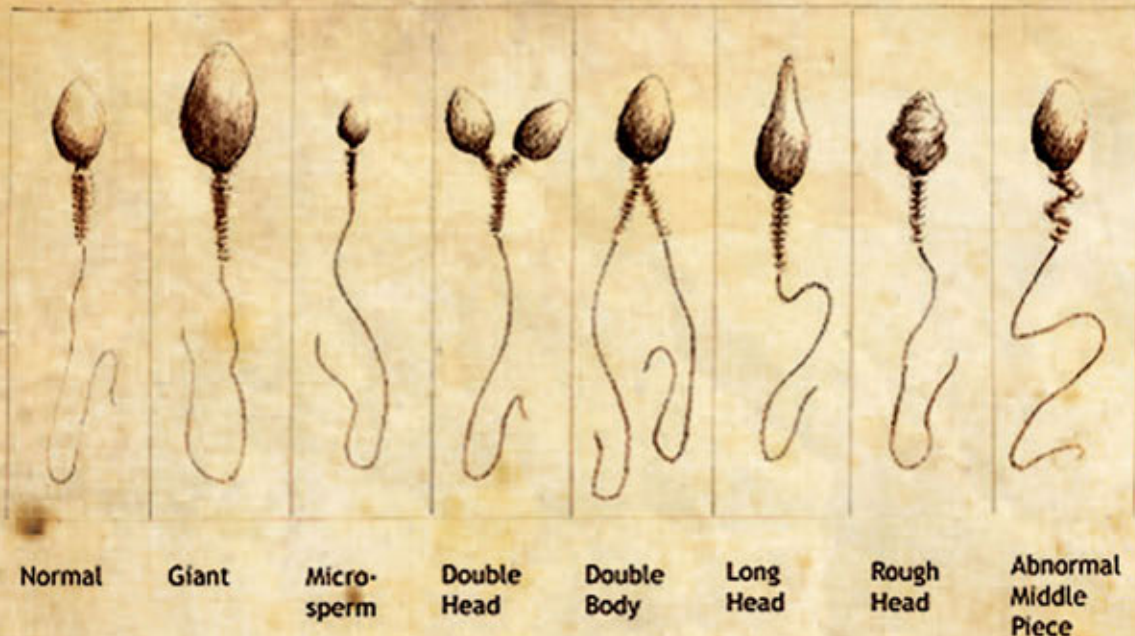
THE PROBLEM IS THAT THE SPERM IN INFERTILE MEN WITH A LOW SPERM COUNT ARE OFTEN NOT FUNCTIONALLY COMPETENT - THEY CANNOT FERTILISE THE EGG. THE FACT THAT ONLY 20% OF THE SPERM ARE MOTILE MEANS THAT 80% ARE IMMOTILE - AND IF SO MANY SPERM CANNOT EVEN SWIM, ONE WORRIES ABOUT THE FUNCTIONAL ABILITY OF THE REMAINING SPERM.

WHAT IS NORMAL SPERM MORPHOLOGY ?

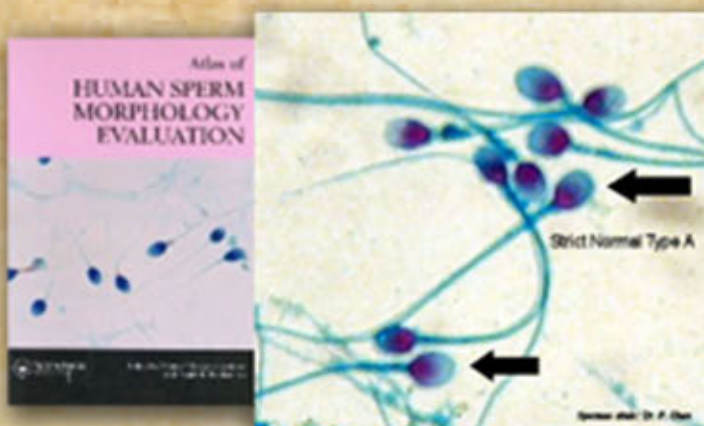
IDEALLY, NORMAL SPERM HAVE A REGULAR OVAL HEAD, WITH A CONNECTING MID-PIECE AND A LONG STRAIGHT TAIL. THIS IS CALLED THEIR FORM OR MORPHOLOGY.



Sperm Morphology



IF TOO MANY SPERMS ARE ABNORMALLY SHAPED (THIS IS CALLED TERATOZOOSPERMIA, WHEN SPERM HAVE ABNORMALITIES SUCH AS ROUND HEADS; PIN HEADS; VERY LARGE HEADS; DOUBLE HEADS; ABSENT TAILS) THIS MAY MEAN THE SPERM ARE FUNCTIONALLY ABNORMAL AND WILL NOT BE ABLE TO FERTILISE THE EGG.



MANY LABS USE KRUGER "STRICT" CRITERIA, DEVELOPED IN SOUTH AFRICA FOR JUDGING SPERM NORMALITY. ONLY SPERM WHICH ARE "PERFECT" ARE CONSIDERED TO BE NORMAL. A NORMAL SAMPLE SHOULD HAVE AT LEAST 15% NORMAL FORMS, WHICH MEANS EVEN UP TO 85% ABNORMAL FORMS IS CONSIDERED TO BE ACCEPTABLE!

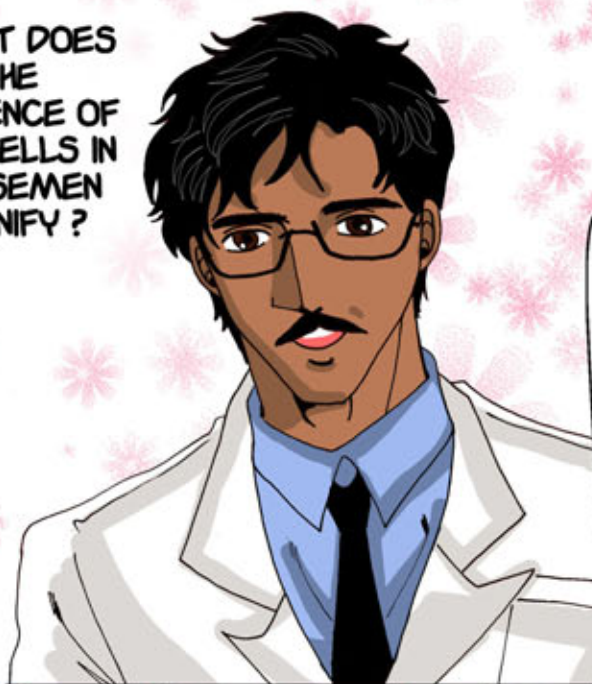


UNDER THE MICROSCOPE, THIS IS SEEN AS THE SPERMS STICKING TOGETHER TO ONE ANOTHER IN BUNCHES. THIS IMPAIRS SPERM MOTILITY AND PREVENTS THE SPERMS FROM SWIMMING UPTO THROUGH THE CERVIX TOWARDS THE EGG.

PUTTING IT ALL TOGETHER, ONE LOOKS FOR THE TOTAL NUMBER OF "GOOD" SPERMS IN THE SAMPLE - THE PRODUCT OF THE TOTAL COUNT, THE PROGRESSIVELY MOTILE SPERM AND THE NORMALLY SHAPED SPERM. THIS GIVES THE PROGRESSIVELY MOTILE NORMAL SPERM COUNT WHICH IS A CRUDE INDEX OF THE FERTILITY POTENTIAL OF THE SPERM.



WHAT DOES
THE
PRESENCE OF
PUS CELLS IN
THE SEMEN
SIGNIFY ?



WHILE A FEW WHITE BLOOD
CELLS IN THE SEMEN IS
NORMAL, MANY PUS CELLS
SUGGESTS THE PRESENCE
OF SEMINAL INFECTION.
UNFORTUNATELY, MANY
LABS CANNOT DIFFERENTI-
ATE BETWEEN SPERM PRE-
CURSOR CELLS AND PUS
CELLS. THIS OFTEN MEANS
THAT MEN ARE
OVERTREATED WITH
ANTIBIOTICS FOR A "SPERM
INFECTION" WHICH DOES NOT
REALLY EXIST !

SOME LABS USE A
COMPUTER TO DO THE
SEMEN ANALYSIS. THIS IS
CALLED CASA, OR COMPUTER
ASSISTED SEMEN ANALYSIS.
WHILE IT MAY APPEAR TO BE
MORE RELIABLE (BECAUSE
THE TEST HAS BEEN DONE
"OBJECTIVELY" BY A
COMPUTER), THERE ARE
STILL MANY CONTROVERSIES
ABOUT ITS REAL VALUE,
SINCE MANY OF THE
TECHNICAL DETAILS HAVE NOT
BEEN STANDARDISED, AND
VARY FROM LAB TO LAB.



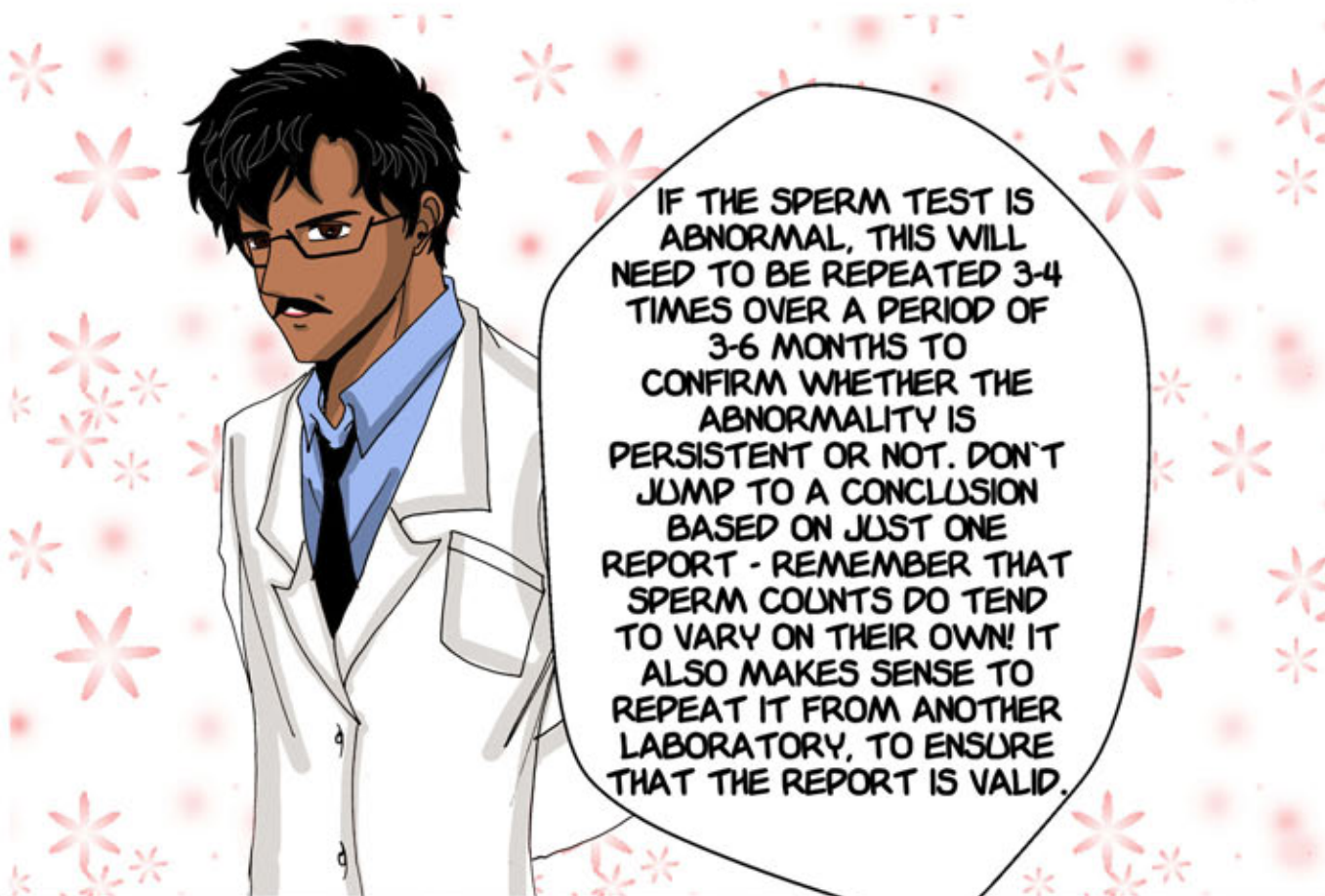


A NORMAL SPERM REPORT IS REASSURING, AND USUALLY DOES NOT NEED TO BE REPEATED. IF THE SEMEN ANALYSIS IS NORMAL, MOST DOCTORS WILL NOT EVEN NEED TO EXAMINE THE MAN, SINCE THIS IS THEN SUPERFLUOUS. HOWEVER, REMEMBER THAT JUST BECAUSE THE SPERM COUNT AND MOTILITY ARE IN THE NORMAL RANGE, THIS DOES NOT NECESSARILY MEAN THAT THE MAN IS "FERTILE".

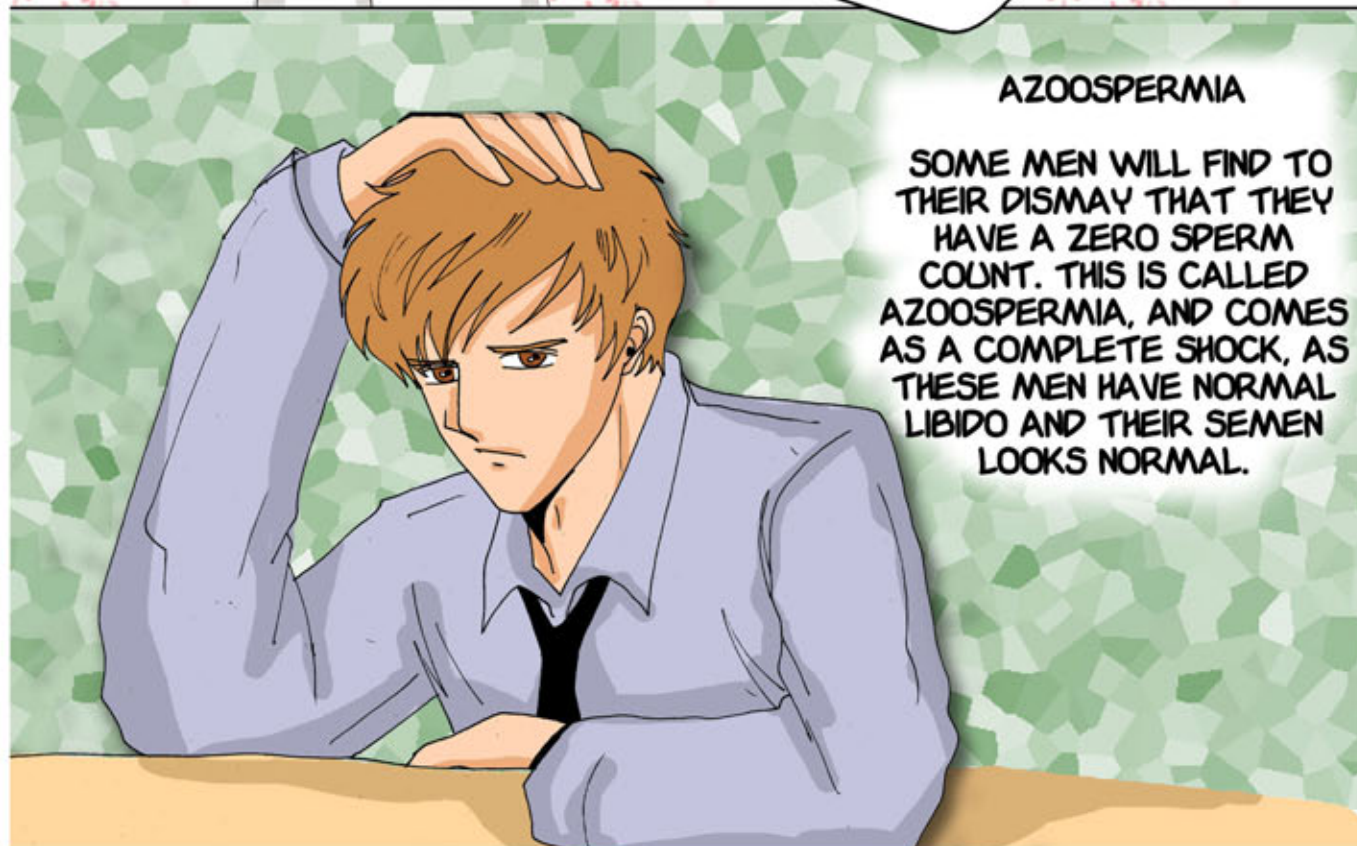
WHAT ARE THE REASONS FOR A POOR SEMEN ANALYSIS REPORT ?



- INCORRECT SEMEN COLLECTION TECHNIQUE, IF THE SAMPLE IS NOT COLLECTED PROPERLY, OR IF THE CONTAINER IS DIRTY
- TOO LONG A TIME DELAY BETWEEN PROVIDING THE SAMPLE AND ITS TESTING IN THE LABORATORY
- TOO SHORT AN INTERVAL SINCE THE PREVIOUS EJACULATION
- RECENT SYSTEMIC ILLNESS IN THE LAST 3 MONTHS



IF THE SPERM TEST IS ABNORMAL, THIS WILL NEED TO BE REPEATED 3-4 TIMES OVER A PERIOD OF 3-6 MONTHS TO CONFIRM WHETHER THE ABNORMALITY IS PERSISTENT OR NOT. DON'T JUMP TO A CONCLUSION BASED ON JUST ONE REPORT - REMEMBER THAT SPERM COUNTS DO TEND TO VARY ON THEIR OWN! IT ALSO MAKES SENSE TO REPEAT IT FROM ANOTHER LABORATORY, TO ENSURE THAT THE REPORT IS VALID.



AZOOSPERMIA

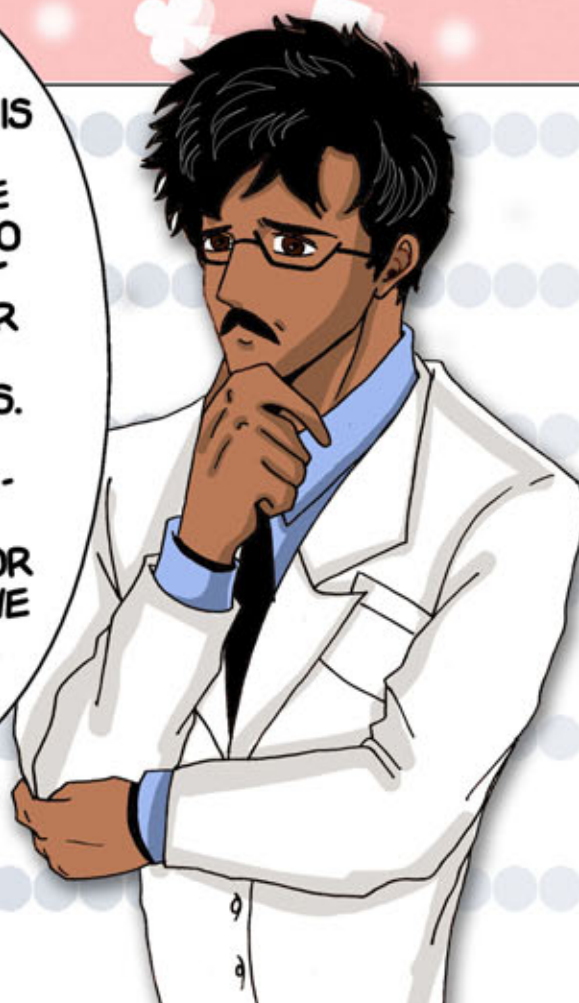
SOME MEN WILL FIND TO THEIR DISMAY THAT THEY HAVE A ZERO SPERM COUNT. THIS IS CALLED AZOOSPERMIA, AND COMES AS A COMPLETE SHOCK, AS THESE MEN HAVE NORMAL LIBIDO AND THEIR SEMEN LOOKS NORMAL.

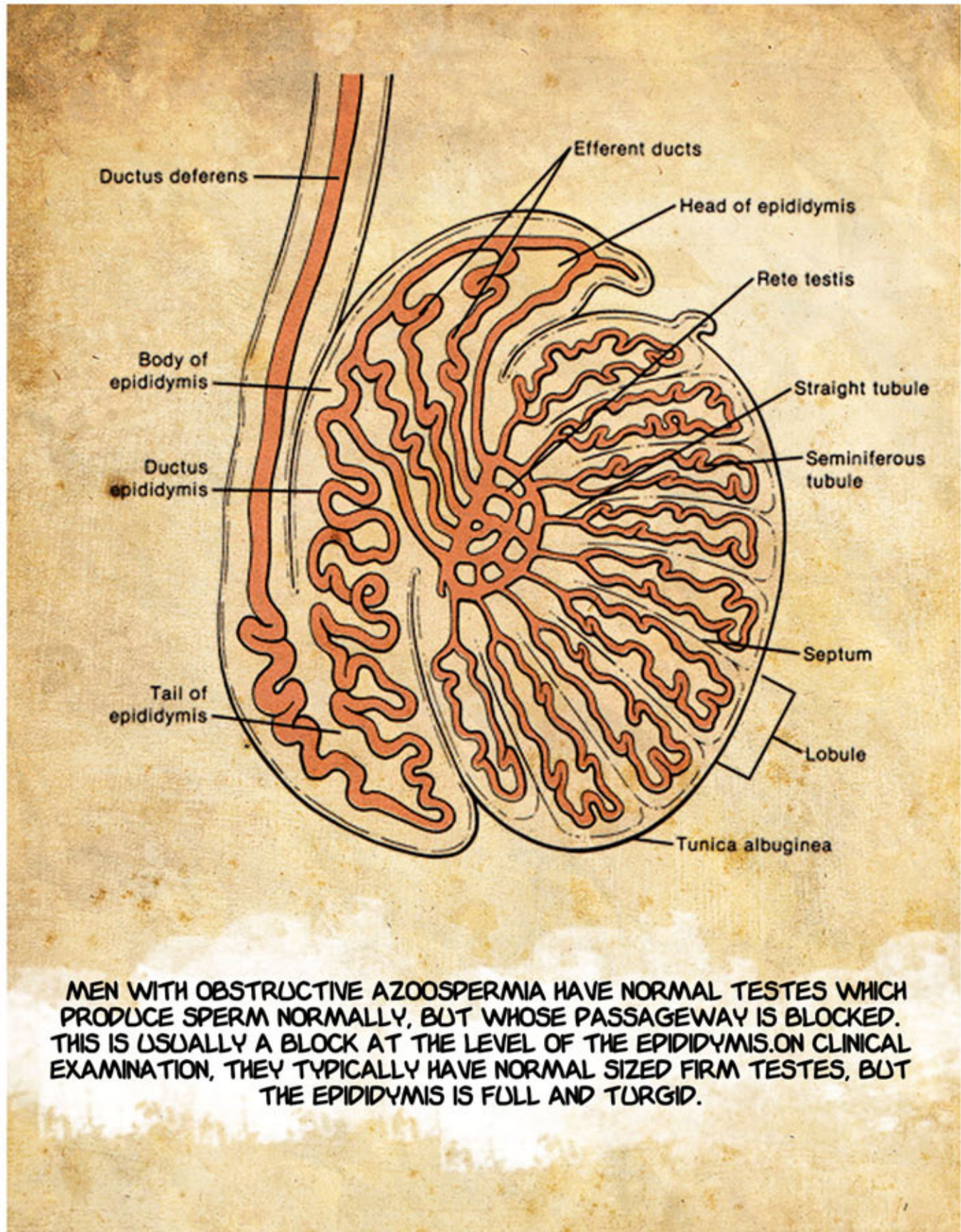


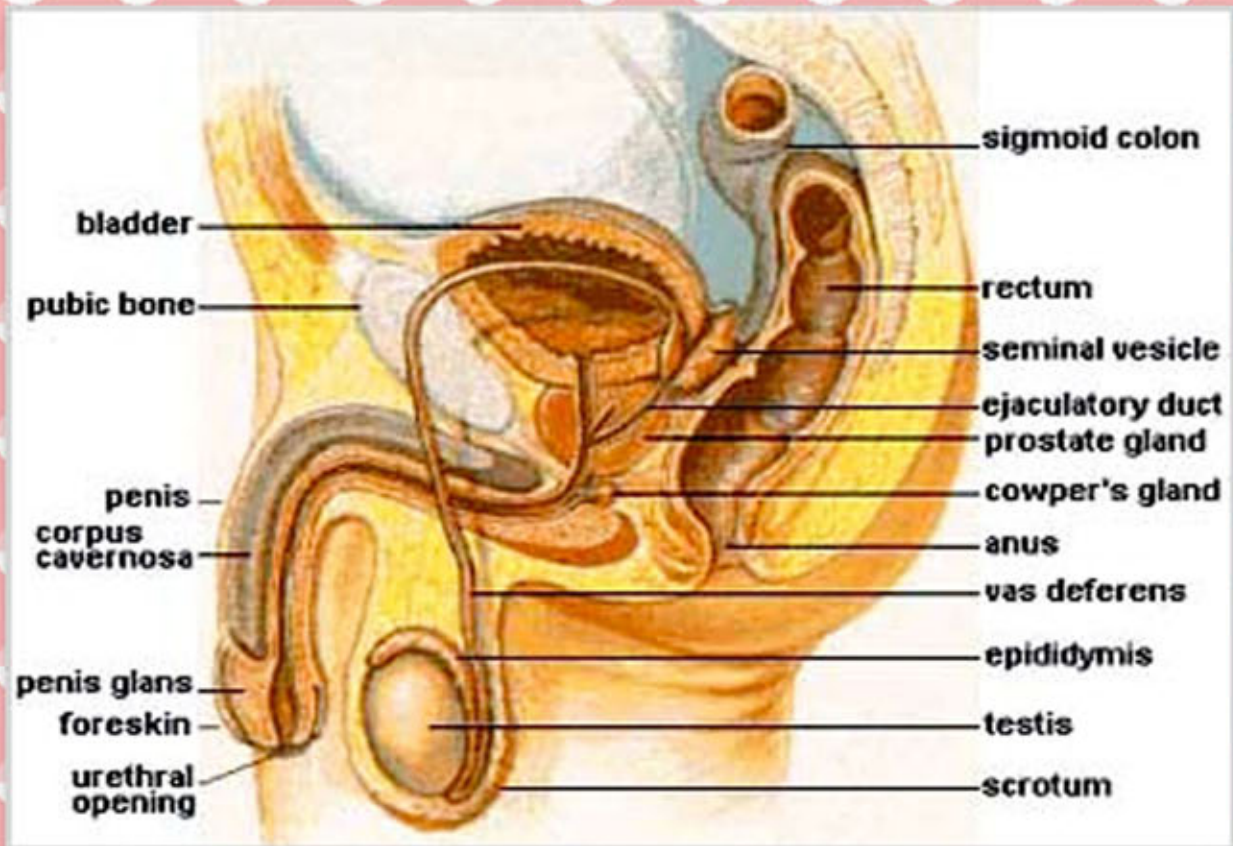


IF THE REPORT SHOWS YOUR SPERM COUNT IS ZERO, PLEASE ASK THE LABORATORY TO RE-CHECK IT AGAIN. ASK THEM TO CHECK TWO CONSECUTIVE SEMEN SAMPLES, EJACULATED ABOUT 1 HOUR APART (SEQUENTIAL SEMEN ANALYSIS). THE LABORATORY SHOULD ALSO CENTRIFUGE THE SAMPLE AND CHECK THE PELLET FOR SPERM PRECURSORS. SOME MEN WILL HAVE OCCASIONAL SPERM IN THE PELLET, WHICH MEANS THEY ARE NOT REALLY AZOOSPERMIC. THIS IS CALLED CRYPTOZOOSPERMIA (HIDDEN SPERM).

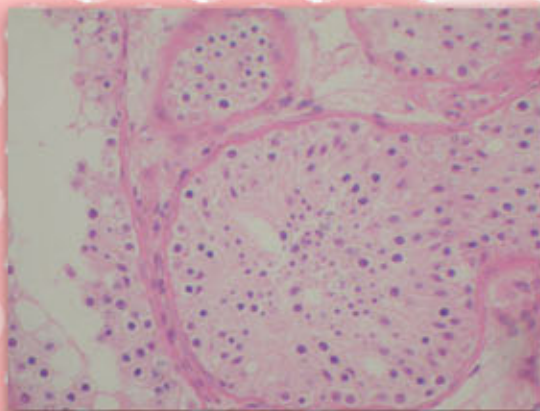
IF THE REPORT IS PERSISTENTLY ZERO, THEN THE NEXT STEP IS TO FIND OUT WHAT THE REASON FOR THE AZOOSPERMIA IS. THERE ARE 2 POSSIBILITIES - OBSTRUCTIVE AZOOSPERMIA; OR NON-OBSTRUCTIVE AZOOSPERMIA.







SOME MEN HAVE OBSTRUCTIVE AZOOSPERMIA BECAUSE OF AN ABSENT VAS DEFERENS. THEIR SEMEN VOLUME IS LOW (0.5 ML OR LESS); THE PH IS ACIDIC AND THE FRUCTOSE IS NEGATIVE. THE DIAGNOSIS CAN BE CONFIRMED BY CLINICAL EXAMINATION, WHICH SHOWS THE VAS IS ABSENT.



MEN WITH NON-OBSTRUCTIVE AZOOSPERMIA HAVE A NORMAL PASSAGEWAY, BUT ABNORMAL TESTICULAR FUNCTION, AND THEIR TESTES DO NOT PRODUCE SPERM NORMALLY. SOME OF THESE MEN MAY HAVE SMALL TESTES ON CLINICAL EXAMINATION. THE TESTICULAR FAILURE MAY BE PARTIAL, WHICH MEANS THAT ONLY A FEW AREAS OF THE TESTES PRODUCE SPERM, BUT THIS SPERM PRODUCTION IS NOT ENOUGH FOR IT TO BE EJACULATED.





OTHER MEN MAY HAVE COMPLETE TESTICULAR FAILURE, WHICH MEANS THERE IS NO SPERM PRODUCTION AT ALL IN THE ENTIRE TESTES. THE ONLY WAY TO DIFFERENTIATE BETWEEN COMPLETE AND PARTIAL TESTICULAR FAILURE IS BY DOING MULTIPLE TESTICULAR MICRO-BIOPSIES TO SAMPLE DIFFERENT AREAS OF THE TESTES AND SEND THEM FOR PATHOLOGICAL EXAMINATION.

WHAT ADDITIONAL TESTS CAN BE DONE FOR A MAN WITH AN ABNORMAL SEMEN ANALYSIS REPORT?

FOR THE MAN WITH A POOR SEMEN SAMPLE, ADDITIONAL TESTS MAY BE RECOMMENDED

THE PRESENCE OF THESE ANTIBODIES CAN BE TESTED IN THE BLOOD OF BOTH PARTNERS, IN THE CERVICAL MUCUS, AND IN THE SEMINAL FLUID.

ANTISPERM ANTIBODIES TEST

THE ROLE OF ANTISPERM ANTIBODIES IN CAUSING MALE INFERTILITY IS CONTROVERSIAL. HOWEVER, SOME MEN (OR THEIR WIVES) WILL POSSESS ANTIBODIES AGAINST THE SPERM, WHICH IMMOBILIZE OR KILL THEM AND PREVENT THEM FROM SWIMMING UP TOWARDS THE EGG.



THERE ARE MANY METHODS OF PERFORMING THIS TEST, WHICH CAN BE QUITE DIFFICULT TO STANDARDIZE, AS A RESULT OF WHICH THERE IS A LOT OF VARIABILITY BETWEEN THE RESULT REPORTS OF DIFFERENT LABORATORIES.

PERHAPS, THE BEST METHOD AVAILABLE TODAY IS ONE SUCH USES IMMUNOBEDS, WHICH ALLOW DETERMINATION OF THE LOCATION OF THE ANTIBODIES ON THE SPERM SURFACE.

OF COURSE, IF THE TEST IS NEGATIVE, THIS IS REASSURING; THE PROBLEM REALLY ARISES WHEN THE TEST IS POSITIVE! WHAT THIS SIGNIFIES AND WHAT TO DO ABOUT IT ARE HIGHLY VEXATIOUS ISSUES AND DOCTORS ARE EVEN MORE CONFUSED ABOUT THIS ASPECT THAN THE PATIENTS





SEMEN CULTURE TEST IN THE SEMEN CULTURE TEST, THE SEMEN SAMPLE IS TESTED FOR THE PRESENCE OF BACTERIA, AND, IF PRESENT, THEIR SENSITIVITY TO ANTIBIOTICS IS DETERMINED. INTERPRETING THIS TEST CAN ALSO BE PROBLEMATIC! IT IS NORMAL TO FIND SOME BACTERIA IN NORMAL SEMEN SAMPLES - AND THE QUESTION WHICH MUST BE ANSWERED IS :ARE THESE BACTERIA DISEASE- CAUSING OR NOT?

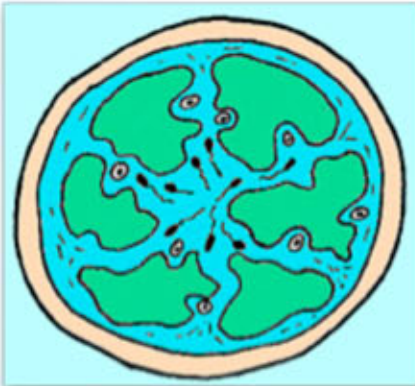


POSTCOITAL TEST (PCT)

IT'S DONE WHEN THE WIFE IS IN THE " FERTILE" PERIOD, AT WHICH TIME THE CERVICAL MUCUS IS PROFUSE AND CLEAR. THE GYNECOLOGIST EXAMINES A SMALL SAMPLE OF THE CERVICAL MUCUS, UNDER THE MICROSCOPE, A FEW HOURS AFTER INTERCOURSE. FINDING 5-10 MOTILE SPERM PER HIGH POWER MICROSCOPIC FIELD MEANS THAT THE TEST IS NORMAL. A NORMAL TEST IMPLIES NORMAL SPERM FUNCTION AND CAN BE VERY REASSURING.

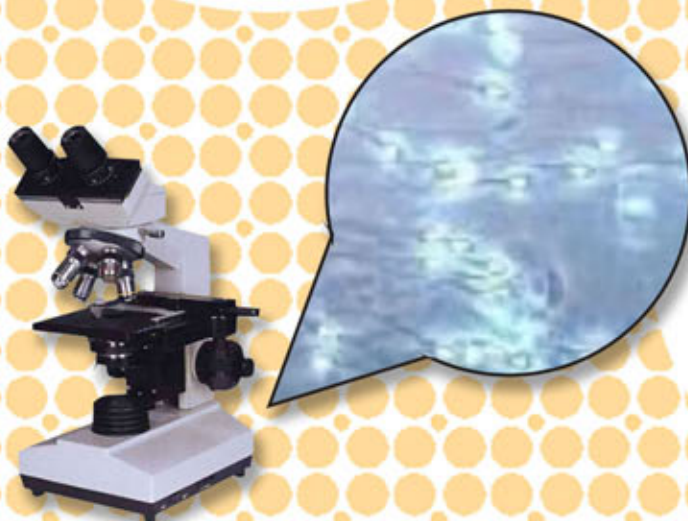
AN ABNORMAL TEST NEEDS TO BE REPEATED AND, IF THE PROBLEM IS PERSISTENT, ONE NEEDS TO DETERMINE IF THE DEFECT LIES IN THE SPERM OR IN THE MUCUS, BY CROSS-TESTING WITH THE HUSBAND'S SPERM.





BOVINE CERVICAL MUCUS TEST
 THE BOVINE CERVICAL MUCUS TEST IS ANOTHER FORM OF TESTING FOR THE ABILITY OF THE SPERM TO PENETRATE AND SWIM THROUGH CERVICAL MUCUS. THE MUCUS USED IS THAT OF A COW (THIS IS COMMERCIALY AVAILABLE IN A TEST KIT.)

SPERM VIABILITY OR SPERM SURVIVAL TEST
 THIS IS A SIMPLE TEST, WHICH PROVIDES CRUDE (BUT USEFUL!) INFORMATION ON THE FUNCTIONAL POTENTIAL OF THE SPERM. THE SPERM ARE WASHED USING THE SAME METHOD WHICH IS USED FOR IVF (EITHER A PERCOLL SPIN OR SPERM SWIM UP) AND THE WASHED SPERM ARE THEN KEPT IN A CULTURE MEDIUM IN THE LABORATORY INCUBATOR FOR 24 HOURS.



AFTER 24 HOURS, THE SPERM ARE CHECKED UNDER THE MICROSCOPE. IF THE SPERM ARE STILL SWIMMING ACTIVELY, THIS MEANS THAT THEY HAVE THE ABILITY TO "SURVIVE" IN VITRO FOR THIS PERIOD- AND THIS IS REASSURING. IF, HOWEVER, NONE OF THE SPERM ARE ALIVE AFTER 24 HOURS, THIS SUGGEST THAT THEY MAY BE FUNCTIONALLY INCOMPETENT.



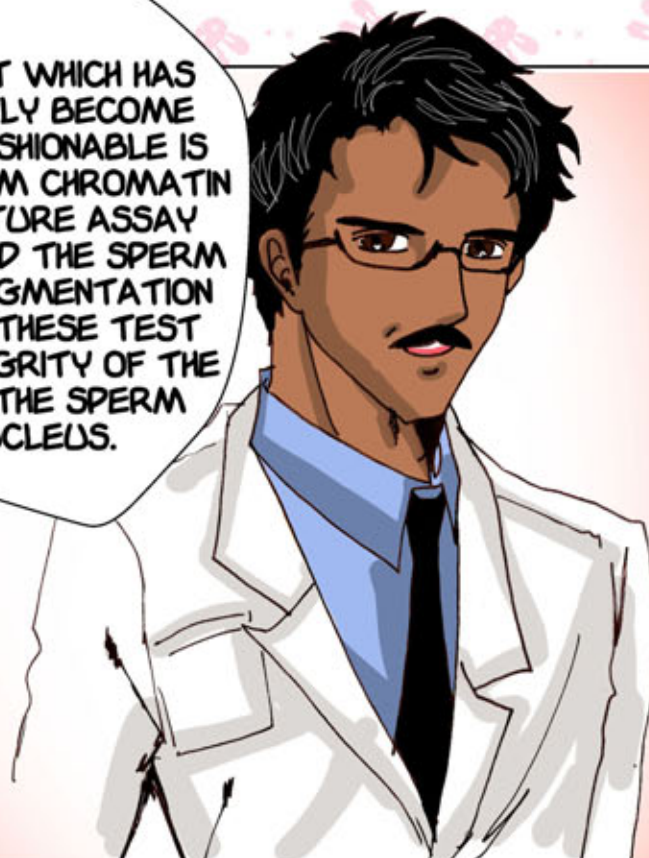


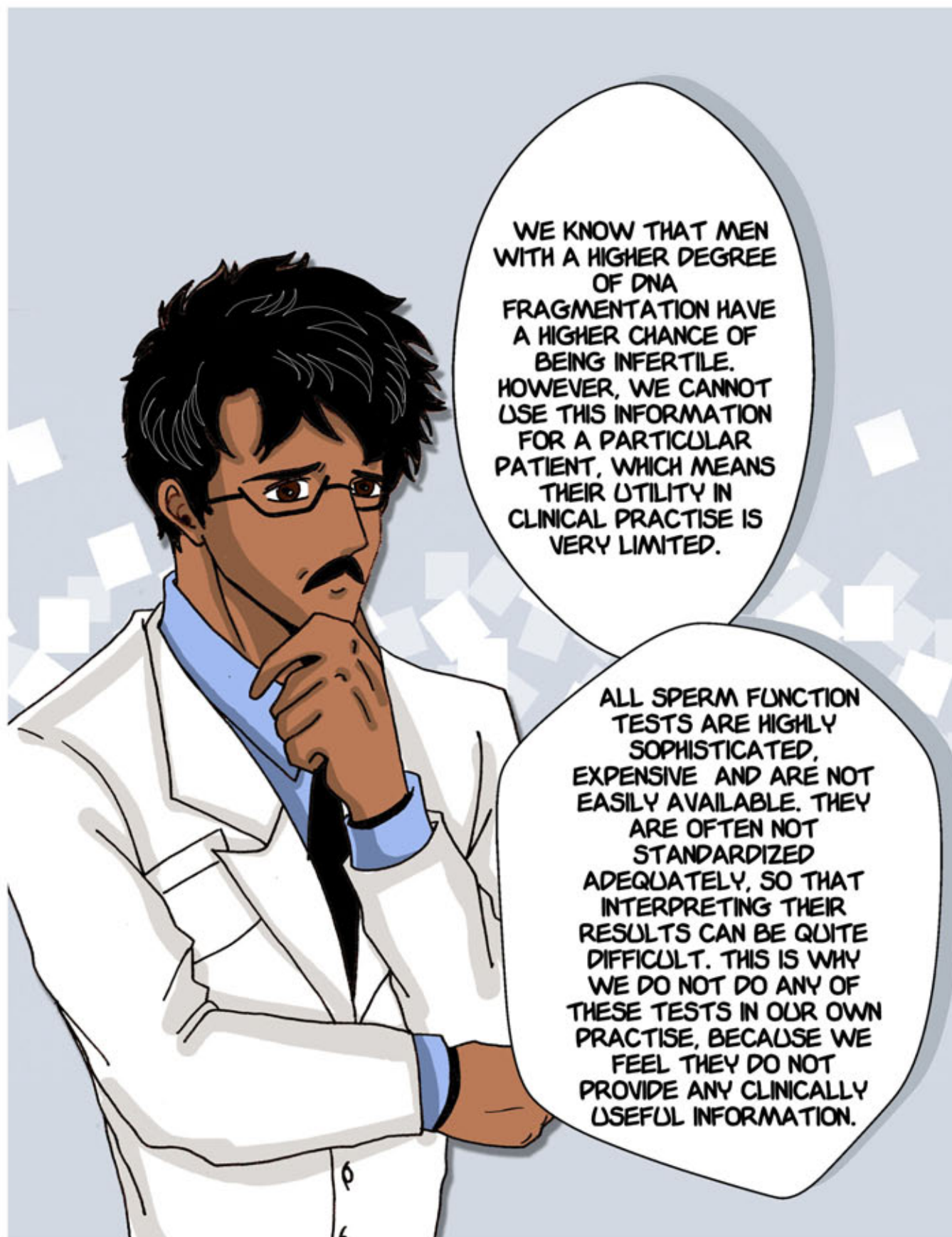
SPERM PENETRATION ASSAY (SPA, HAMSTER ASSAY)

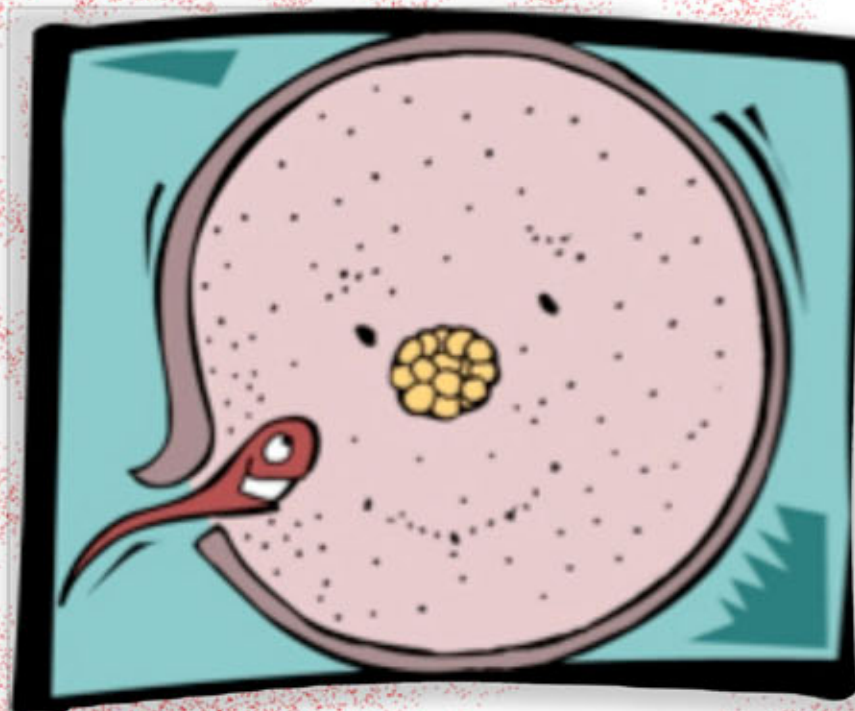
SINCE THE BASIC FUNCTION OF A SPERM IS TO FERTILIZE AN EGG, SCIENTISTS WERE VERY EXCITED WHEN THEY FOUND THAT NORMAL SPERM COULD PENETRATE A DENUDED (ZONA-FREE) HAMSTER EGG. THE EGGS ARE INCUBATED WITH THE SPERM IN AN INCUBATOR IN THE LABORATORY. AFTER 24 HOURS, THE EGGS ARE CHECKED TO ASCERTAIN HOW MANY SPERM HAVE BEEN ABLE TO PENETRATE THE EGG. THE RESULT GIVES A PENETRATION SCORE, WHICH GIVES AN INDEX OF THE SPERM'S FERTILIZING POTENTIAL

A TEST WHICH HAS RECENTLY BECOME VERY FASHIONABLE IS THE SPERM CHROMATIN STRUCTURE ASSAY (SCSA) AND THE SPERM DNA FRAGMENTATION ASSAY. THESE TEST THE INTEGRITY OF THE DNA IN THE SPERM NUCLEUS.

WHILE THEY SEEM VERY ATTRACTIVE, THE MAJOR PROBLEM WITH THESE TESTS IS THAT THEY DO NOT PROVIDE INFORMATION WHICH IS USEFUL FOR AN INDIVIDUAL PATIENT .







THE ULTIMATE SPERM FUNCTION TEST IS IVF, SINCE THIS DIRECTLY ASSESSES WHETHER OR NOT THE HUSBAND'S SPERM CAN FERTILIZE THE WIFE'S EGGS. IT IS OBVIOUSLY NOT PRACTICABLE OR FEASIBLE TO USE IVF AS A TEST FOR SPERM FUNCTION IN CLINICAL PRACTICE.

WHAT BLOOD TESTS CAN BE DONE FOR INFERTILE MEN ?

FOR MOST INFERTILE MEN, THE SEMEN ANALYSIS IS THE ONLY TEST WHICH NEEDS TO BE DONE - AFTER ALL, THE ONLY JOB OF A MAN IS TO PROVIDE SPERM TO FERTILISE THE EGG ! FOR MEN WITH A LOW SPERM COUNT, THERE IS NO NEED TO DO ANY OTHER TESTS, SINCE THESE DO NOT PROVIDE ANY USEFUL INFORMATION.

HOWEVER, MANY DOCTORS STILL DO BLOOD TESTS FOR MEASURING THE LEVELS OF KEY REPRODUCTIVE HORMONES, SUCH AS PROLACTIN, FSH, LH AND TESTOSTERONE. THESE ARE JUST A WASTE OF TIME AND MONEY SINCE THEY PROVIDE NO USEFUL INFORMATION AND DO NOT ALTER THE TREATMENT PLAN.

HOWEVER, FOR MEN WITH AZOOSPERMIA(ZERO SPERM COUNT), ADDITIONAL BLOOD TESTS MAY BE USEFUL . THE SERUM FSH (FOLLICLE-STIMULATING HORMONE) LEVEL TEST IS A USEFUL ONE FOR ASSESSING TESTICULAR FUNCTION

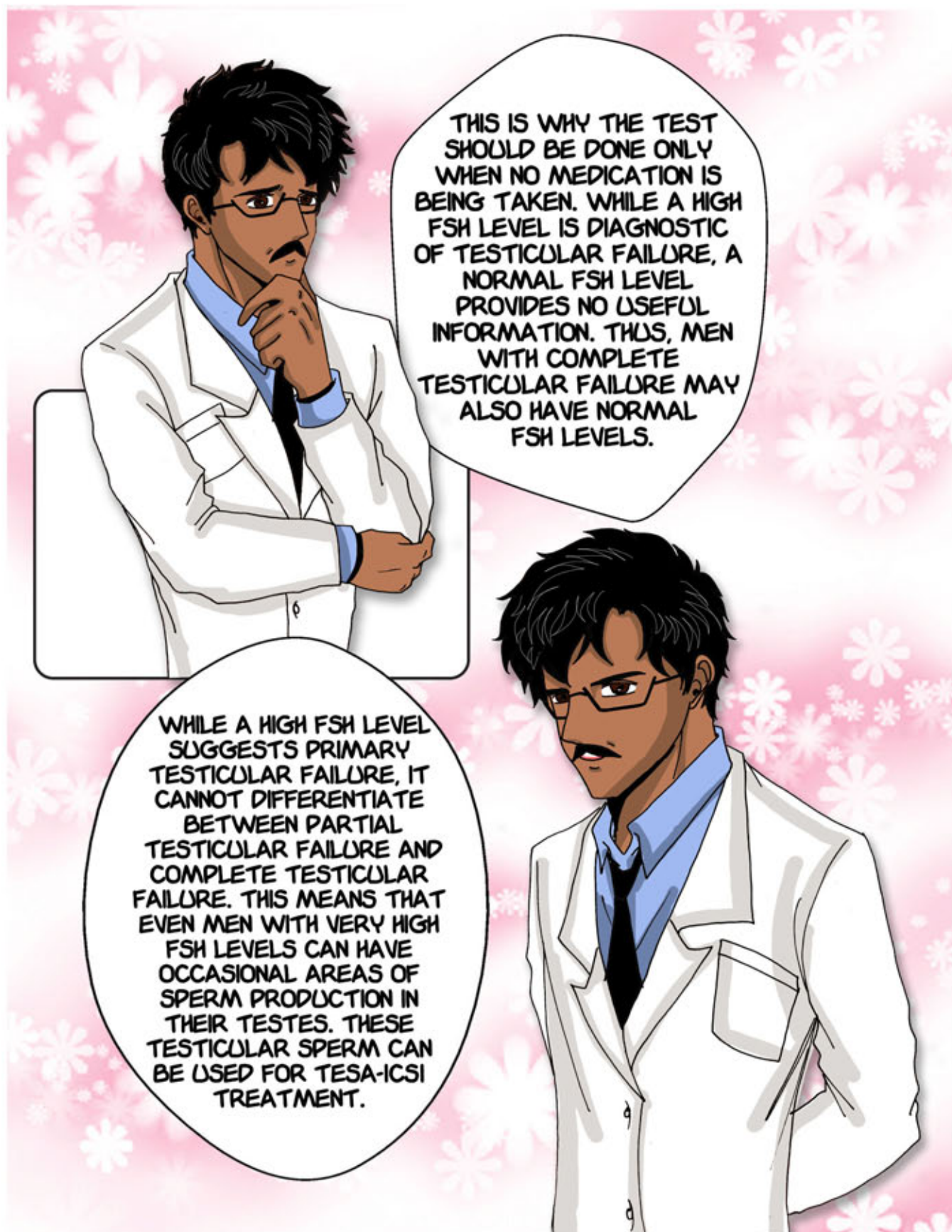


A HIGH FSH LEVEL SUGGESTS PRIMARY TESTICULAR FAILURE, A CONDITION IN WHICH THE SEMINIFEROUS TUBULES IN THE TESTES DO NOT PRODUCE SPERM NORMALLY, BECAUSE THEY ARE DAMAGED. MANY OF THESE MEN HAVE SMALL TESTES. THE SIZE OF THE TESTIS CAN BE JUDGED ON A CLINICAL EXAMINATION WITH THE HELP OF AN ORCHIDOMETER.



THIS TEST IS DONE BY A RADIOIMMUNOASSAY OR CHEMILUMINESCENT ASSAY, AND SINCE IT IS A SOPHISTICATED TEST, IT IS BEST DONE IN A SPECIALIZED LABORATORY. ABNORMAL TEST RESULTS SHOULD BE REPEATED AND RECHECKED FOR CONFIRMATION. THE ONLY OTHER REASON FOR A HIGH FSH LEVEL IN SOME MEN IS THE CONSUMPTION OF CLOMIPHENE TABLETS.

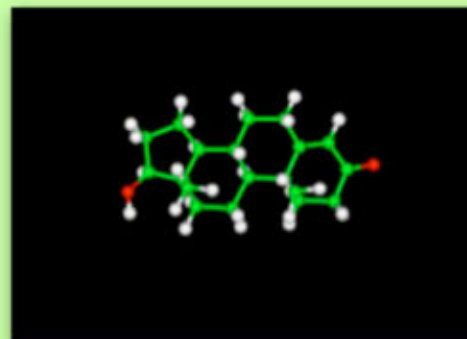




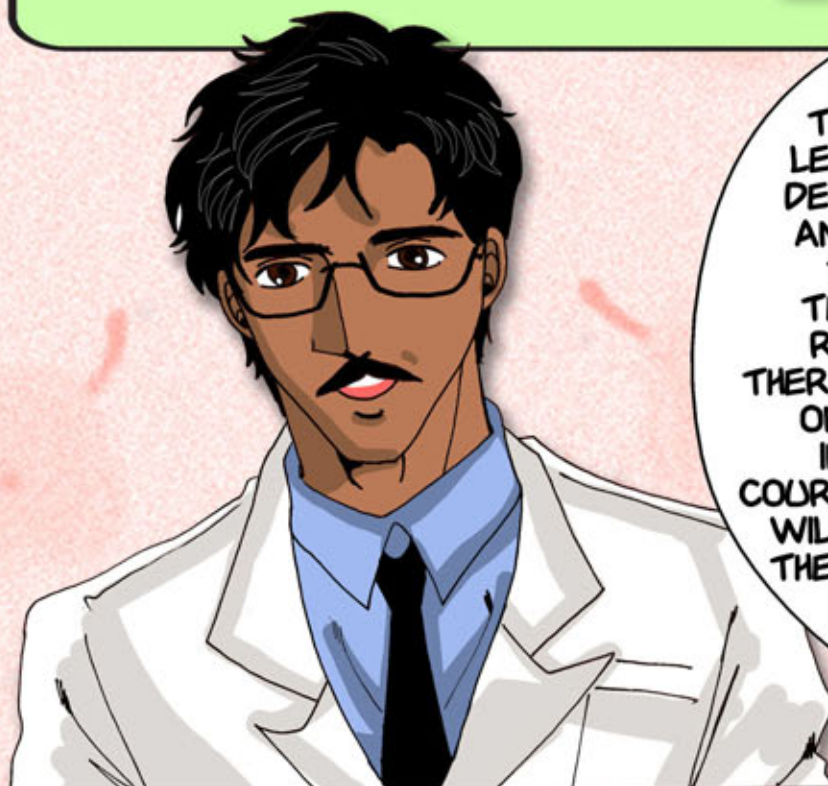


RARELY, THE FSH LEVEL MAY BE LOW. A LOW FSH LEVEL IS FOUND IN PATIENTS WITH HYPOGONADOTROPIC-HYPOGONADISM. HYPOGONADOTROPIC HYPOGONADISM IS AN UNCOMMON (BUT TREATABLE!) CAUSE OF AZOOSPERMIA. ALONG WITH AN FSH LEVEL TEST, MOST DOCTORS ALSO DO A LH (LUTEINIZING HORMONE) LEVEL TEST, WHICH PROVIDES MOSTLY THE SAME INFORMATION.

A TESTOSTERONE LEVEL TEST PROVIDES INFORMATION ON WHETHER OR NOT THE TESTES ARE PRODUCING ADEQUATE AMOUNTS OF THE MALE HORMONE, TESTOSTERONE. MOST INFERTILE MEN HAVE NORMAL TESTOSTERONE LEVELS, BECAUSE THE COMPARTMENT FOR TESTOSTERONE PRODUCTION IS SEPARATE FROM THE COMPARTMENT WHICH PRODUCES SPERM, AND THIS IS USUALLY INTACT IN INFERTILE MEN.



A LOW TESTOSTERONE LEVEL CAN CAUSE DECREASED LIBIDO AND THIS CAN BE TREATED BY TESTOSTERONE REPLACEMENT THERAPY, IN THE FORM OF TABLETS OR INJECTIONS. OF COURSE, THIS THERAPY WILL NOT INCREASE THE SPERM COUNT.

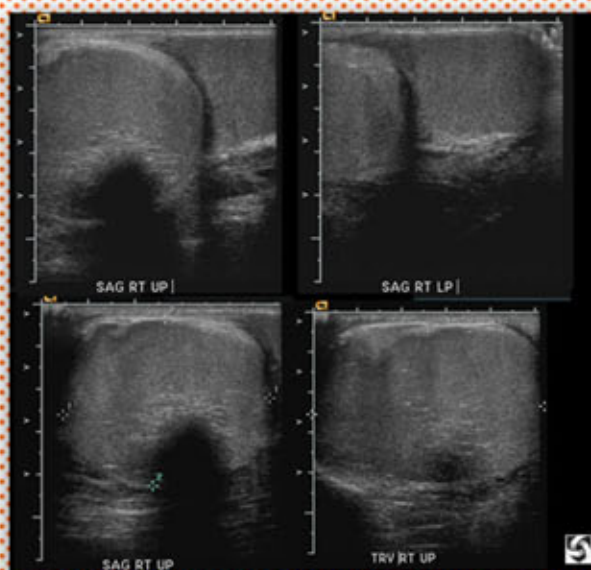




FOR MEN WITH AZOOSPERMIA AND ERECTILE DYSFUNCTION, MEASURING THE PROLACTIN LEVEL WILL HELP TO DETECT MEN WHO HAVE HYPERPROLACTINEMIA (HIGH PROLACTIN LEVELS). THOUGH THIS IS A RARE PROBLEM, THIS CAN BE EFFECTIVELY TREATED WITH MEDICAL THERAPY WITH BROMOCRIPTINE AND THE RESULTS ARE VERY GRATIFYING.

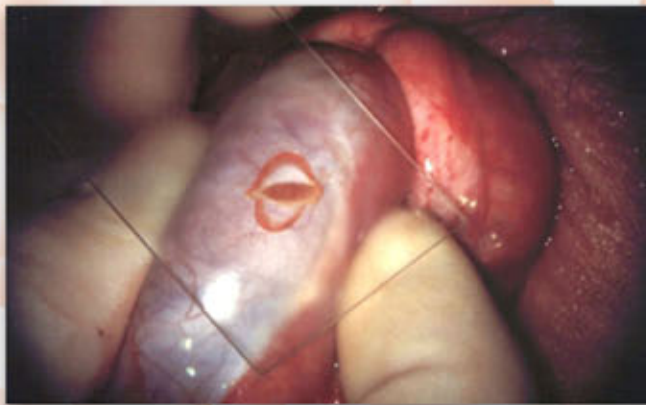
OF WHAT USE IS AN ULTRASOUND EXAM IN EVALUATING AN INFERTILE MAN ?

AN ULTRASOUND OF THE TESTIS HAS BECOME A POPULAR TEST TO PERFORM, BUT ITS HELPFULNESS IS LIMITED. THE SIZE OF THE TESTIS IS BETTER ASSESSED BY CLINICAL EXAMINATION, USING AN ORCHIDOMETER. WHILE A DOPPLER ULTRASOUND WILL OFTEN DIAGNOSE THE PRESENCE OF A VARICOCELE, THIS IS USUALLY OF LITTLE CLINICAL SIGNIFICANCE AND SURGERY TO CORRECT IT RARELY BENEFITS THE PATIENT. A TRANSRECTAL ULTRASOUND (TRUS) CAN BE USEFUL, BUT ONLY IN EVALUATING SELECTED PATIENTS WITH OBSTRUCTIVE AZOOSPERMIA. THIS TEST IS BEST ORDERED BY A SPECIALIST.

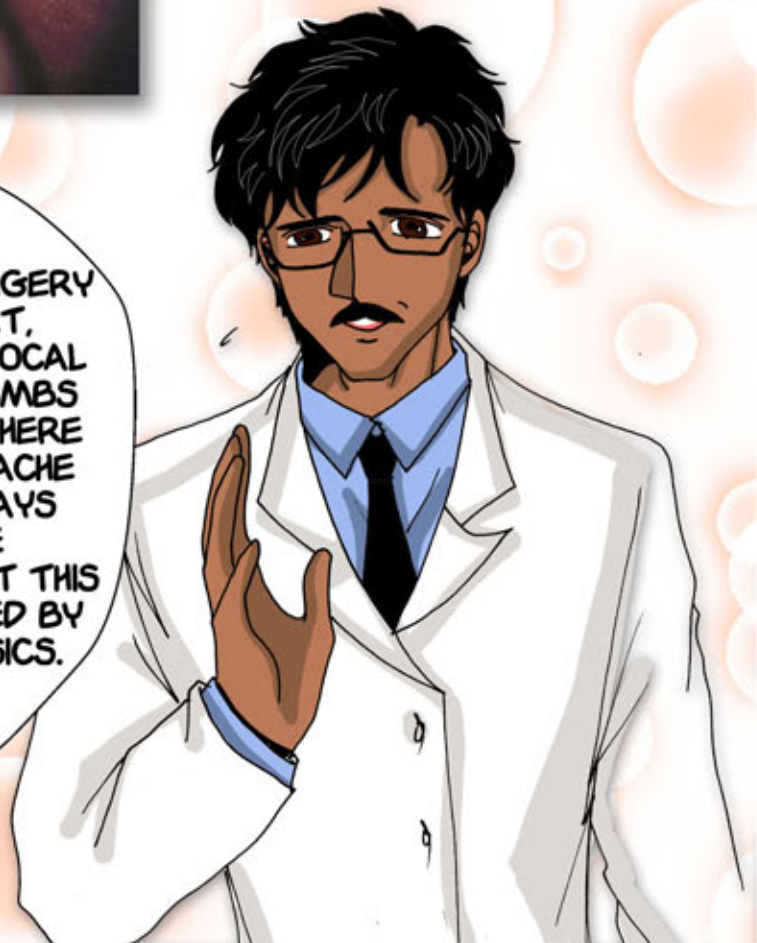


OF WHAT USE IS TESTICULAR BIOPSY?

A TESTICULAR BIOPSY IS DONE IN ORDER TO FIND OUT WHETHER SPERM ARE BEING PRODUCED IN THE TESTIS . THIS IS THE "GOLD STANDARD" SINCE TESTICULAR TISSUE IS BEING EXAMINED DIRECTLY UNDER THE MICROSCOPE IN THE PATHOLOGY LABORATORY. THIS IS A SIMPLE SURGICAL PROCEDURE, WHICH CAN BE DONE UNDER A LOCAL ANAESTHETIC, IN AN OPERATION THEATRE OR EVEN IN THE DOCTOR'S CLINIC. MULTIPLE BIOPSIES SHOULD BE TAKEN FOR A COMPLETE EVALUATION.



THE BIOPSY SURGERY DOESN'T HURT, BECAUSE THE LOCAL ANESTHETIC NUMBS THE TISSUES. THERE MAY BE DULL ACHES FOR A FEW DAYS AFTER THE PROCEDURE, BUT THIS CAN BE RELIEVED BY MILD ANALGESICS.





THE ONLY GROUP OF INFERTILE MEN WHO SHOULD BE OFFERED A TESTIS BIOPSY ARE THOSE WITH AZOOSPERMIA. MEN WITH OLIGOSPERMIA SHOULD NOT BE SUBJECTED TO A TESTIS BIOPSY BECAUSE THE BIOPSY REPORT IS ALWAYS NORMAL IN THESE MEN (AND THIS IS NOT SURPRISING - AFTER ALL, SINCE SPERM ARE PRESENT IN THE SEMEN, THEY ARE OBVIOUSLY BEING PRODUCED IN THE TESTES!)



SINCE A SINGLE BIOPSY MAY NOT BE REPRESENTATIVE OF THE ENTIRE TESTIS, IN ORDER TO GET A TRUE PICTURE OF SPERM PRODUCTION IN THE TESTIS, THE DOCTOR NEEDS TO SAMPLE AT LEAST 4 DIFFERENT AREAS OF THE TESTIS. ASK YOUR DOCTOR TO SEND THE TESTICULAR TISSUE TO THE PATHOLOGY LABORATORY IN A SPECIAL PRESERVATIVE CALLED BOUVIN'S FLUID.



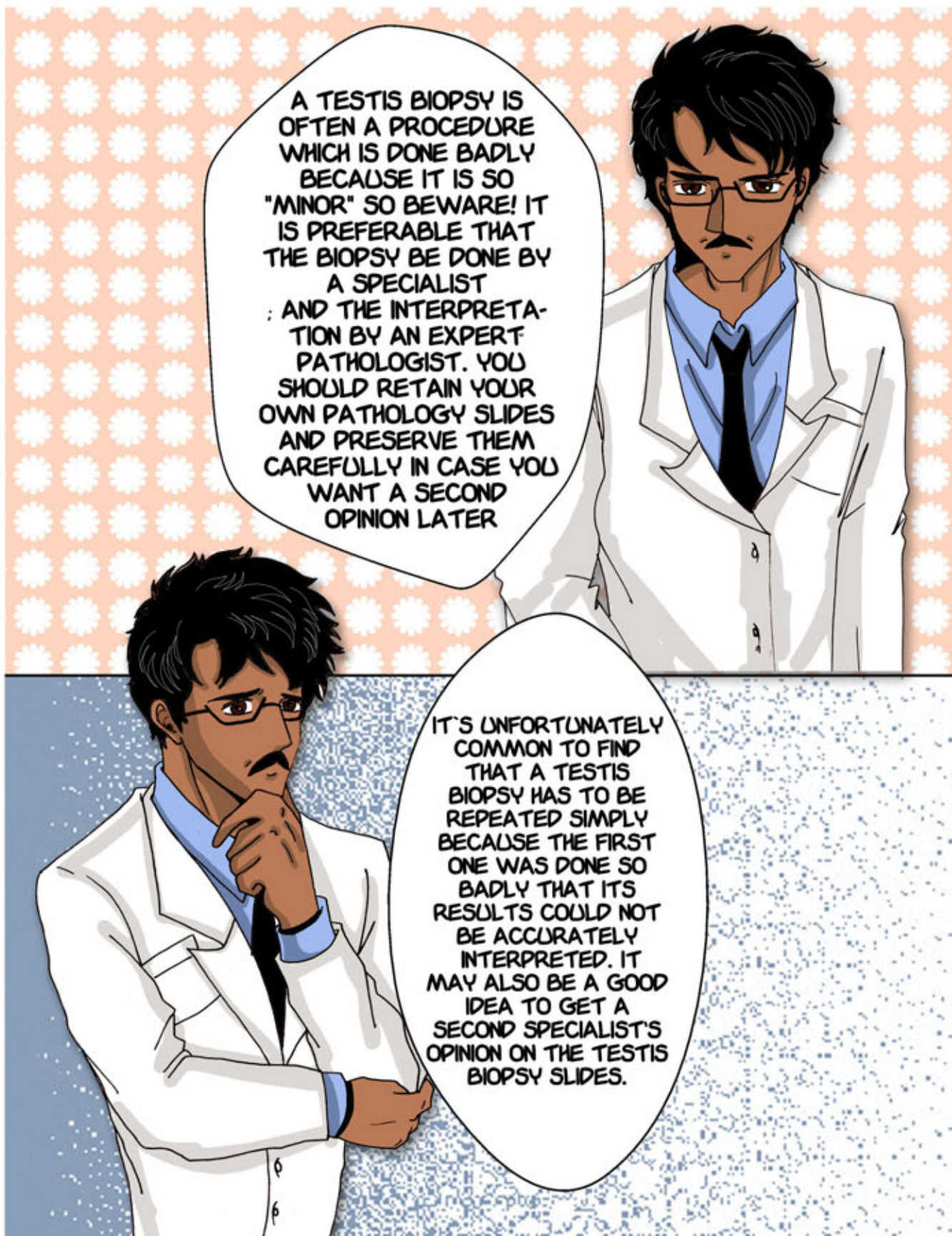
IN THE PAST, A TESTIS BIOPSY WAS PURELY A DIAGNOSTIC PROCEDURE. TODAY, IT IS ALSO USED TO RETRIEVE TESTICULAR SPERM IN ORDER TO TREAT MEN WITH SEVERE MALE FACTOR INFERTILITY. THESE TESTICULAR SPERM CAN BE USED FOR INTRACYTOPLASMIC SPERM INJECTION (ICSI). SPECIALISED IVF CLINICS CAN ALSO FREEZE THE TESTICULAR TISSUE. THIS TESTICULAR SPERM FREEZING CAN BE VERY USEFUL, ESPECIALLY IN MEN WITH SMALL TESTES, AS THE BIOPSY DOES NOT NEED TO BE REPEATED AGAIN DURING TREATMENT.

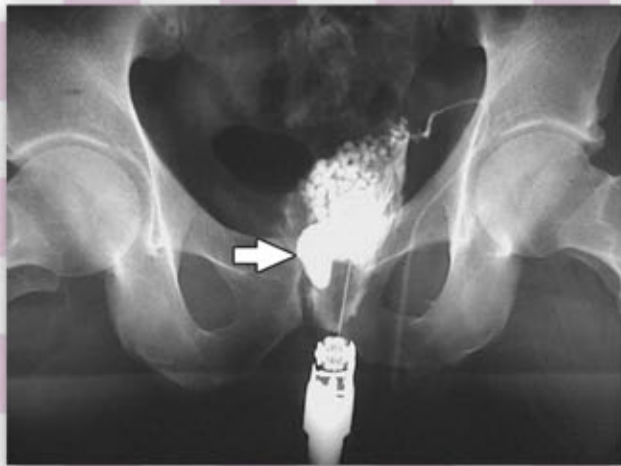
IN SOME CASES, THERE IS NO SPERM PRODUCTION AT ALL ; OR THE SPERM PRODUCTION IS ARRESTED AT A PARTICULAR STAGE. THIS IMPLIES TESTICULAR FAILURE, WHICH IS USUALLY IRREVERSIBLE. THERE IS NO TREATMENT FOR THIS. IF, ON THE OTHER HAND, SPERM PRODUCTION IS NORMAL, THIS MEANS THAT THERE IS A BLOCK IN THE MALE REPRODUCTIVE TRACT.

THE INTERPRETATION

WHILE THE BIOPSY IS AN EASY TEST TO PERFORM, IT SHOULD BE INTERPRETED PROPERLY BY AN EXPERT PATHOLOGIST. THE DOCTOR LOOKS FOR EVIDENCE OF SPERM PRODUCTION IN THE SEMINIFEROUS TUBULES







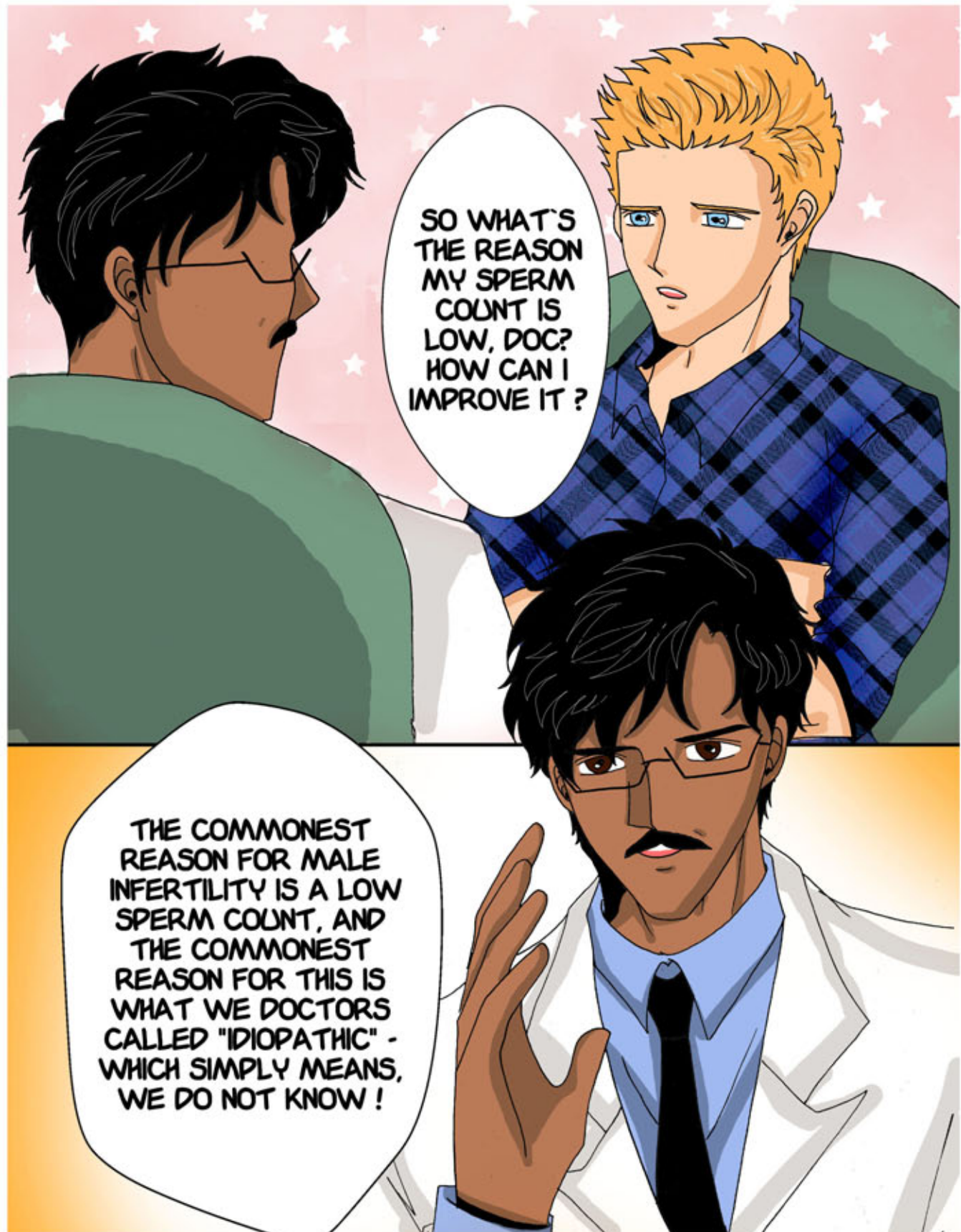
VASOGRAPHY IS ANOTHER SURGICAL TEST IN WHICH A RADIO- OPAQUE DYE IS INJECTED INTO THE VAS TO DETERMINE IF IT IS OPEN, AND, IF BLOCKED, TO FIND OUT THE EXACT SITE OF THE BLOCK. THIS TEST REQUIRES VERY DELICATE SURGERY AND X-RAY EQUIPMENT AND IS INFREQUENTLY DONE BECAUSE IT CAN DAMAGE THE VAS.

FOR SOME MEN WITH TESTICULAR FAILURE, A KARYOTYPE (STUDY OF THE CHROMOSOMES) IS USEFUL, BECAUSE IT ALLOWS ONE TO DETERMINE IF A CHROMOSOMAL PROBLEM (E.G., KLINEFELTER'S SYNDROME, 47, XXY, WITH AN EXTRA X CHROMOSOME) IS RESPONSIBLE FOR THE AZOOSPERMIA.

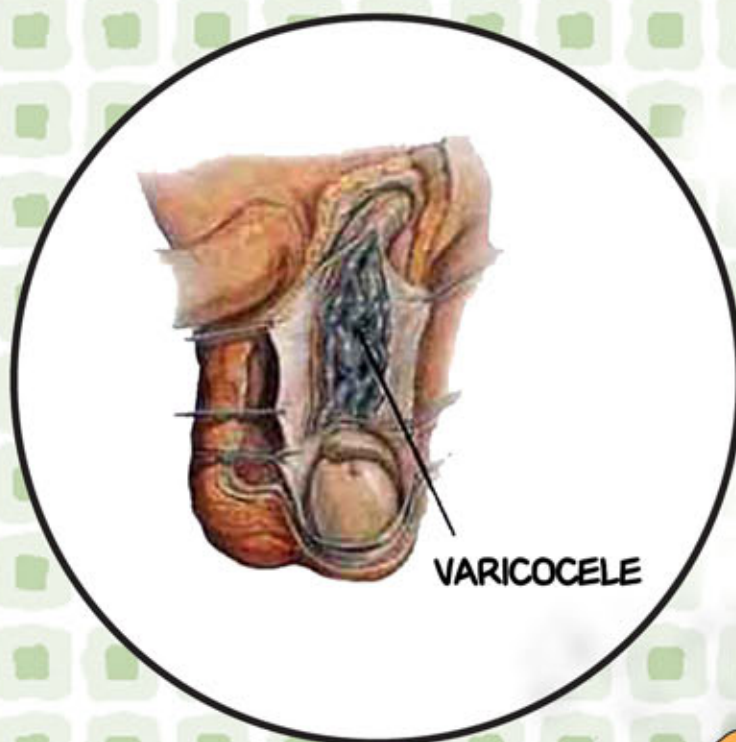


SOME CLINICS ALSO OFFER TESTING FOR MICRODELETIONS ON THE Y-CHROMOSOME(MYC) WHILE THERE IS NO TREATMENT FOR THIS DISORDER, AT LEAST THE TEST RESULT PROVIDES AN ANSWER TO THE QUESTION OF WHY THE TESTES HAVE FAILED. UNFORTUNATELY, THIS IS A QUESTION MEDICINE TODAY STILL CANNOT ANSWER IN THE MAJORITY OF PATIENTS.









WHAT IS A VARICOCELE?

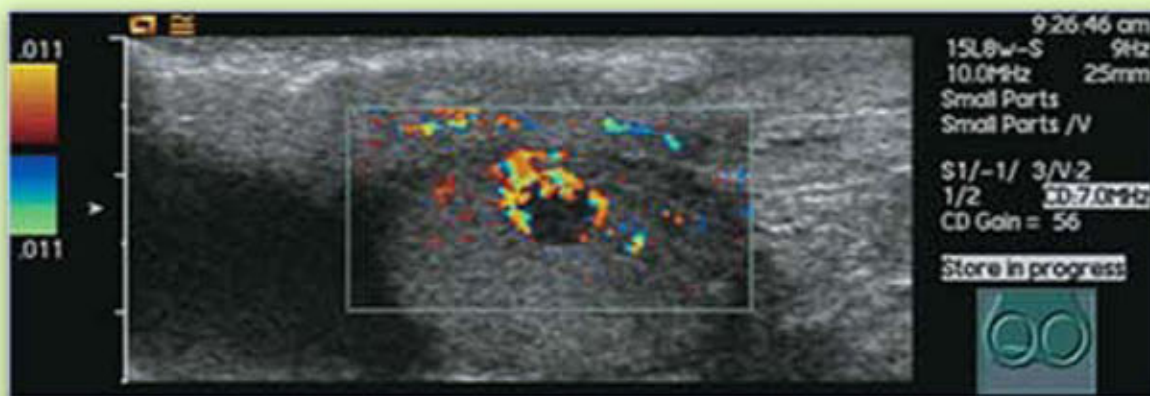
A VARICOCELE IS A SWOLLEN VARICOSE VEIN IN THE SCROTUM - USUALLY ON THE LEFT SIDE. THE CONDITION OCCURS BECAUSE BLOOD POOLS IN THE VARICOSE TESTICULAR VEINS (PAMPINIFORM PLEXUS) SINCE THE VALVES IN THE VEINS ARE LEAKY AND DO NOT CLOSE PROPERLY. THE REASON FOR INFERTILITY ASSOCIATED WITH A VARICOCELE ARE UNCLEAR.

HOW IS A VARICOCELE DIAGNOSED?

THE DOCTOR EXAMINES THE PATIENT IN THE ERECT POSITION AND FEELS THE SPERMATIC CORD - THE CORD LIKE STRUCTURE FROM WHICH THE TESTIS HANGS. THE PATIENT IS ALSO ASKED TO COUGH AT THIS TIME. A VARICOCELE FEELS LIKE A "BUNCH OF WORMS" AND ON COUGHING, THIS GETS TRANSIENTLY ENGORGED.

COUGH!





CONFIRMATION OF THIS DIAGNOSIS IS BEST DONE BY A DOPPLER TEST AT THE SAME TIME. THE DOPPLER IS A SMALL PEN LIKE PROBE WHICH IS APPLIED TO THE CORD. IT BOUNCES SOUND WAVES OFF THE BLOOD VESSELS AND MEASURES BLOOD FLOW BY MAGNIFYING THE SOUND OF BLOOD FLOWING THROUGH THE VEINS. PATIENTS WITH A VARICOCELE HAVE A REFLUX OF BLOOD DURING COUGHING WHICH SHOWS UP AS A LARGE SPIKE ON THE TRACING. OTHER TESTS WHICH ARE DONE UNCOMMONLY TO CONFIRM THE DIAGNOSIS OF A VARICOCELE INCLUDE: DOPPLER ULTRASOUND; SPECIAL X-RAY STUDIES CALLED VENOGRAMS; AND THERMOGRAMS.

WHAT ARE THE AREAS OF CONTROVERSY ABOUT THE VARICOCELE?

MOST DOCTORS ARE STILL NOT SURE WHETHER A VARICOCELE CAUSES A LOW SPERM COUNT OR NOT ! IT IS POSSIBLE THAT THE VARICOCELE MAY BE AN UNRELATED FINDING IN INFERTILE MEN - A "RED HERRING" SO TO SPEAK.

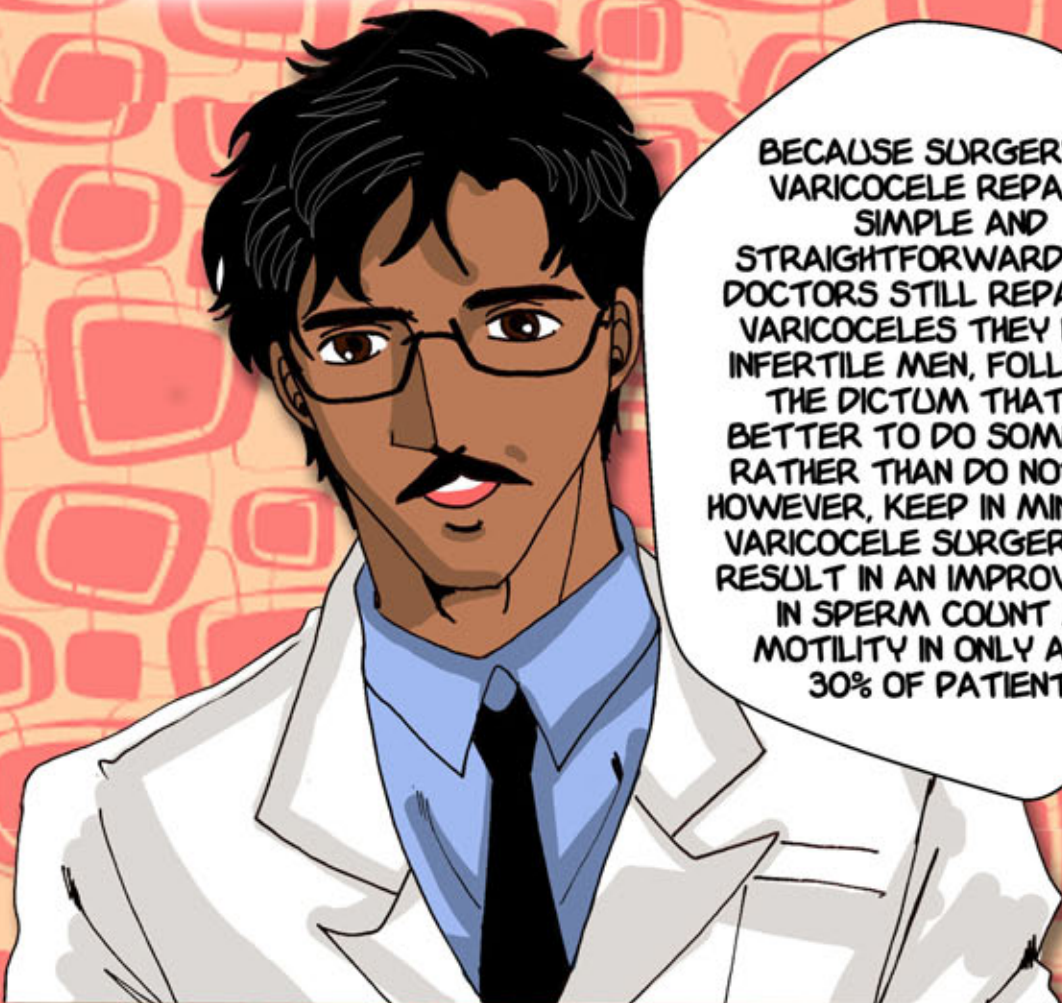




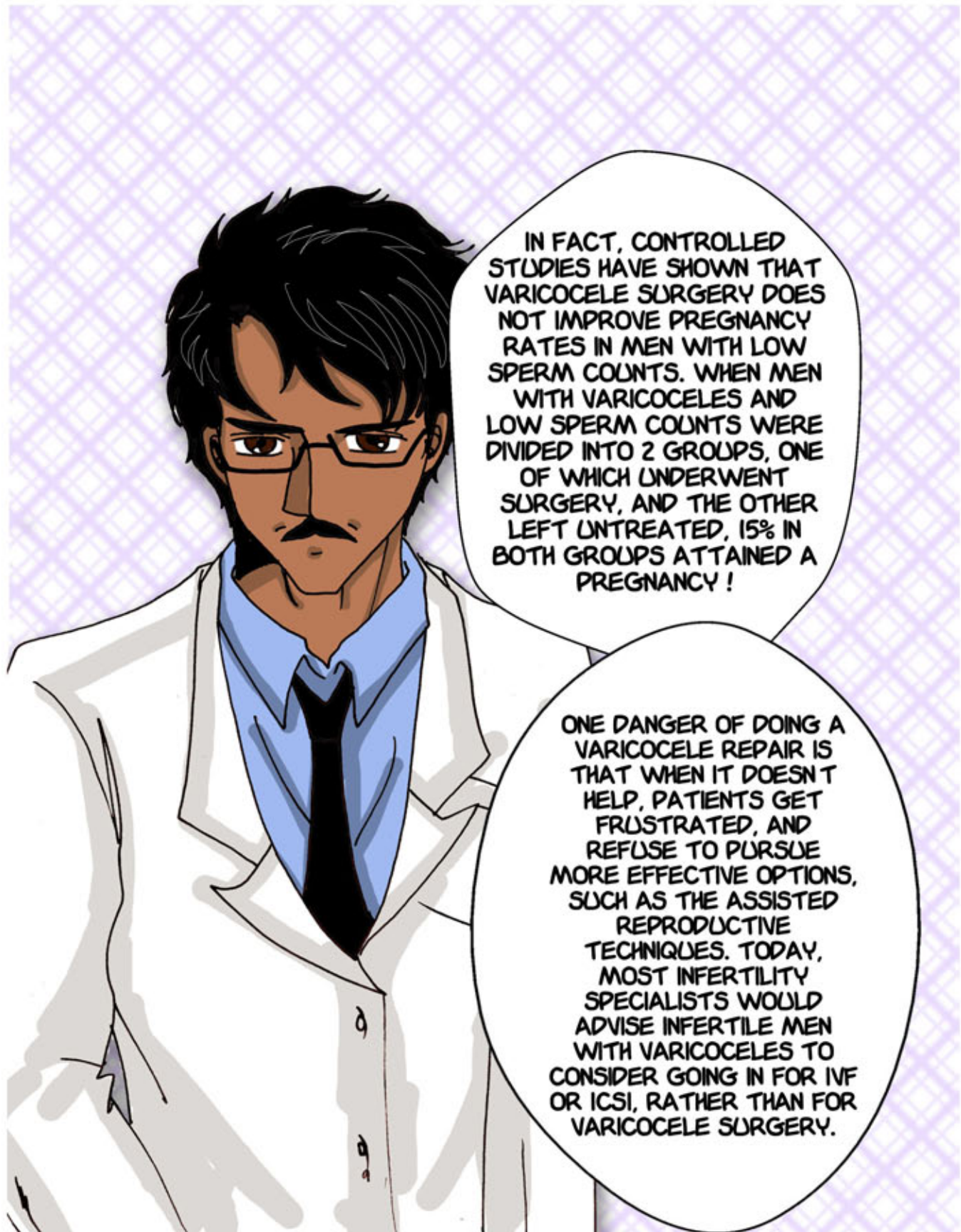
25%

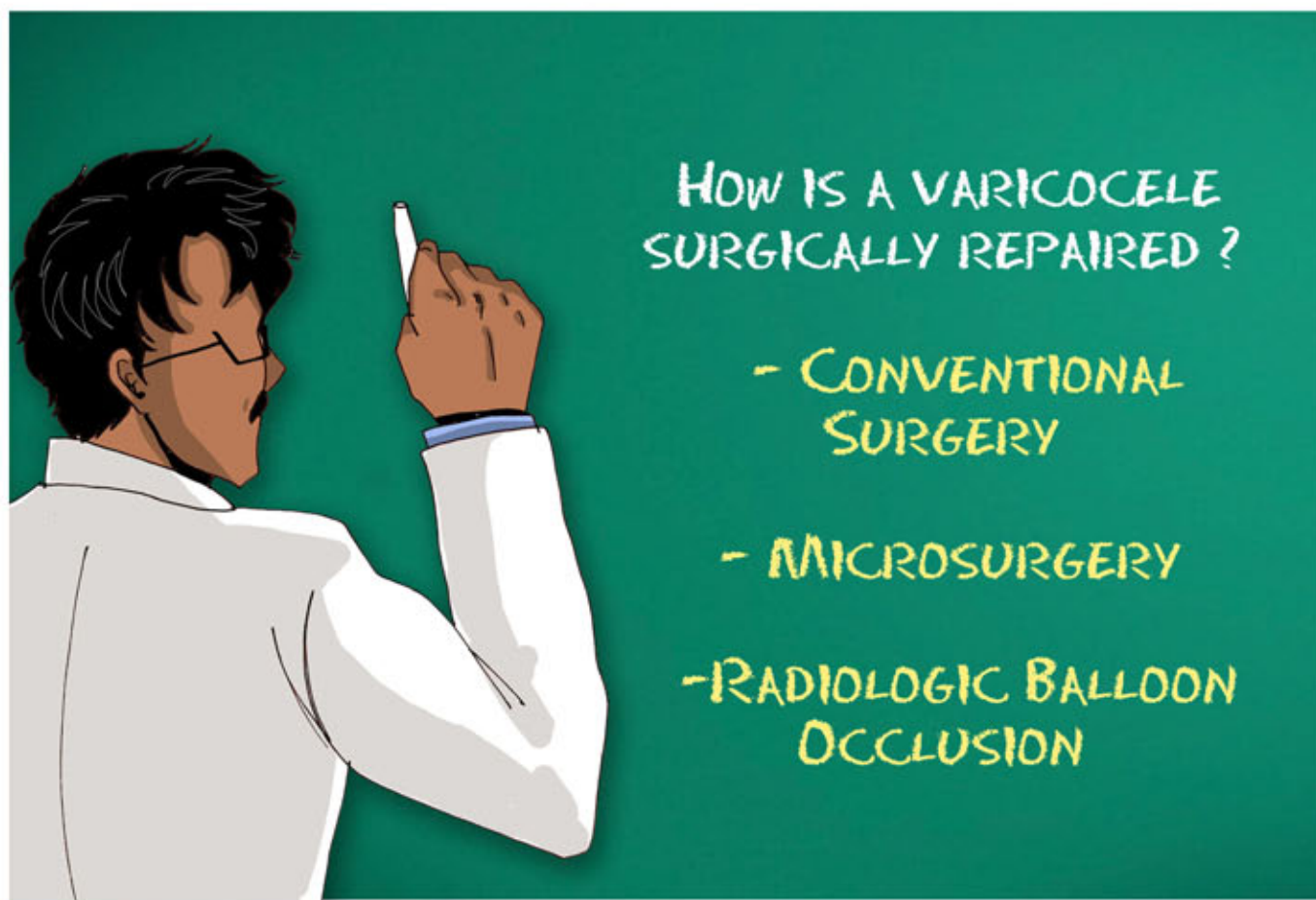
STRANGELY ENOUGH, ONLY A QUARTER OF MEN WITH VARICOCELES HAVE A FERTILITY PROBLEM. THUS, MANY MEN WITH LARGE VARICOCELES HAVE EXCELLENT SPERM COUNTS WHICH IS WHY CORRELATING CAUSE (VARICOCELE) AND EFFECT (LOW SPERM COUNT) IS DIFFICULT.

IS SURGERY FOR VARICOCELE REPAIR USEFUL ?



BECAUSE SURGERY FOR VARICOCELE REPAIR IS SIMPLE AND STRAIGHTFORWARD, MANY DOCTORS STILL REPAIR ANY VARICOCELES THEY FIND IN INFERTILE MEN, FOLLOWING THE DICTUM THAT IT'S BETTER TO DO SOMETHING RATHER THAN DO NOTHING ! HOWEVER, KEEP IN MIND THAT VARICOCELE SURGERY MAY RESULT IN AN IMPROVEMENT IN SPERM COUNT AND MOTILITY IN ONLY ABOUT 30% OF PATIENTS





CONVENTIONAL SURGERY

IN CONVENTIONAL SURGERY, A SMALL CUT IS MADE IN THE GROIN; THE SPERMATIC CORD IS LIFTED OUT OF THE SCROTUM; AND THE ENGORGED VEINS ARE TIED OFF. THIS IS THE COMMONEST METHOD USED. THE RISKS INCLUDE: THE RISK OF THE VARICOCELE RECURRING, WHICH IS ABOUT 20 %; THE RISK OF HYDROCELE FORMATION; AND INADVERTENT DAMAGE TO THE TESTICULAR ARTERY (THE BLOOD SUPPLY TO THE TESTIS) - WHICH CAN ACTUALLY DECREASE SPERM PRODUCTION !



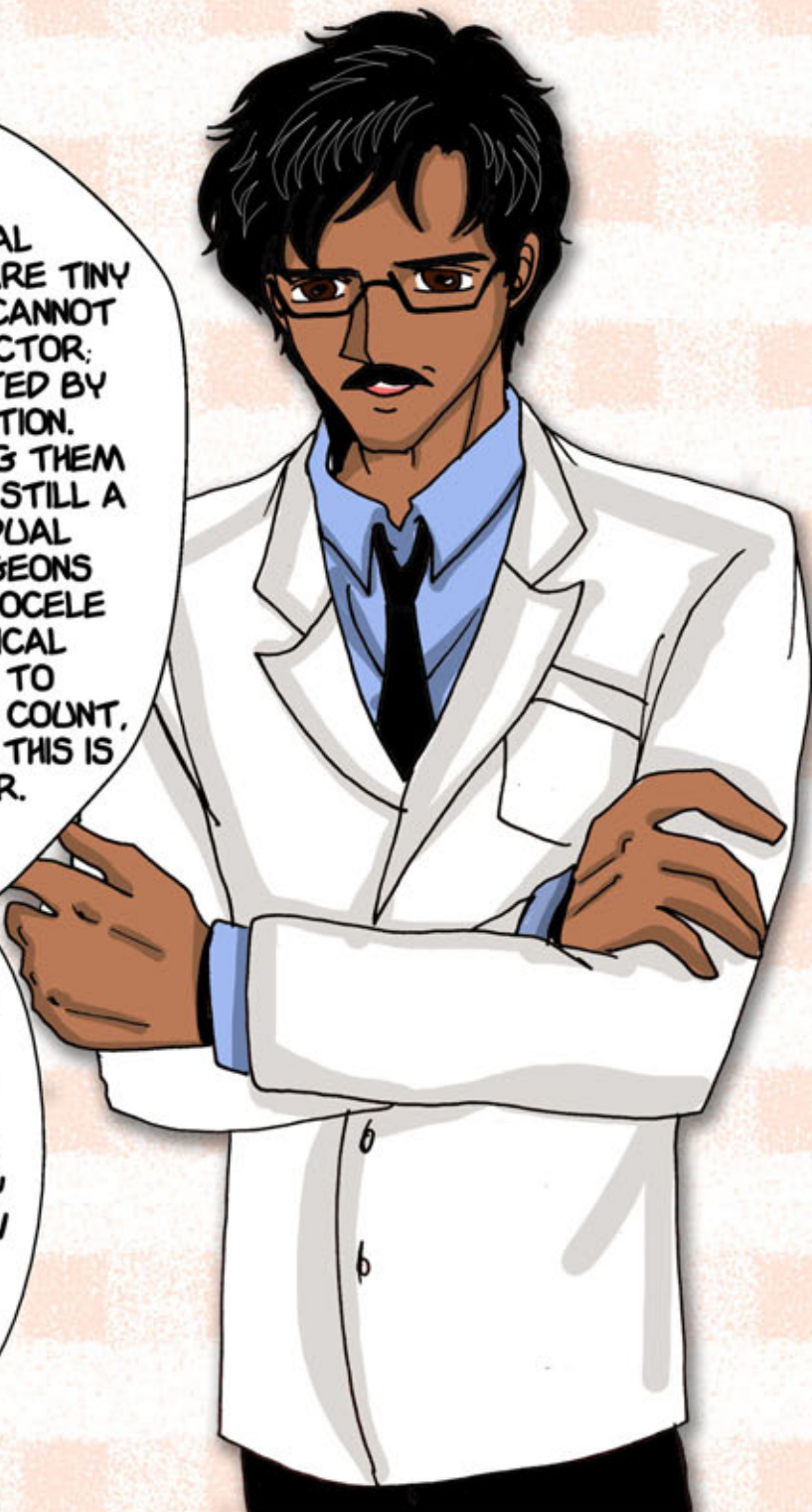


MICROSURGERY IS A NEWER METHOD, IN WHICH UNDER AN OPERATING MICROSCOPE, THE SURGEON INDIVIDUALLY TIES OFF THE ENLARGED VEINS IN THE SPERMATIC CORD. THE TESTICULAR ARTERY AND LYMPHATIC DUCTS CAN BE PRESERVED CONFIDENTLY, BECAUSE THE SURGERY IS DONE UNDER HIGH MAGNIFICATION.



RADIOLOGIC BALLOON OCCLUSION IS NOT VERY COMMONLY PERFORMED. IN THIS MINOR PROCEDURE, A SILICONE BALLOON CATHETER IS PASSED UNDER X-RAY GUIDANCE TO THE TESTICULAR VEIN; HERE THE BALLOON IS INFLATED AND LEFT IN PLACE PERMANENTLY, THUS BLOCKING THE ENGORGED VEINS AND REPAIRING THE VARICOCELE.





THE "SUBCLINICAL VARICOCELE": THESE ARE TINY VARICOCELES WHICH CANNOT BE FELT BY THE DOCTOR, BUT CAN BE DETECTED BY DOPPLER EXAMINATION. WHETHER CORRECTING THEM IS HELPFUL OR NOT IS STILL A MATTER OF INDIVIDUAL OPINION. MANY SURGEONS WILL COMBINE VARICOCELE REPAIR WITH MEDICAL THERAPY TO TRY TO INCREASE THE SPERM COUNT, BUT HOW EFFECTIVE THIS IS STILL NOT CLEAR.

IN OUR CLINIC, WE DO NOT BELIEVE THAT DIAGNOSING OR TREATING A VARICOCELE HELPS IMPROVE FERTILITY IN MEN WITH A LOW SPERM COUNT.

WHAT IS OBSTRUCTIVE AZOOSPERMIA ?

IF THE PASSAGE BETWEEN THE PENIS AND TESTES IS BLOCKED THERE WILL BE NO SPERM IN THE SEMEN (A CONDITION CALLED AZOOSPERMIA) . IF THE REASON FOR THE AZOOSPERMIA IS A DUCT BLOCKAGE, THIS IS CALLED OBSTRUCTIVE AZOOSPERMIA. WHILE BLOCKAGES MAY BE CAUSED BY INFECTION OR BY SURGERY DONE TO REPAIR HERNIAS OR HYDROCELES, OFTEN WE CANNOT DETERMINE THE CAUSE OF THE BLOCK. THE DIAGNOSIS CAN BE SUSPECTED IF THE TESTES ARE NORMAL IN SIZE, AND THE EPIDIDYMISS IS FULL AND TURGID.

WHAT SURGERY CAN BE DONE TO TREAT OBSTRUCTIVE AZOOSPERMIA ?

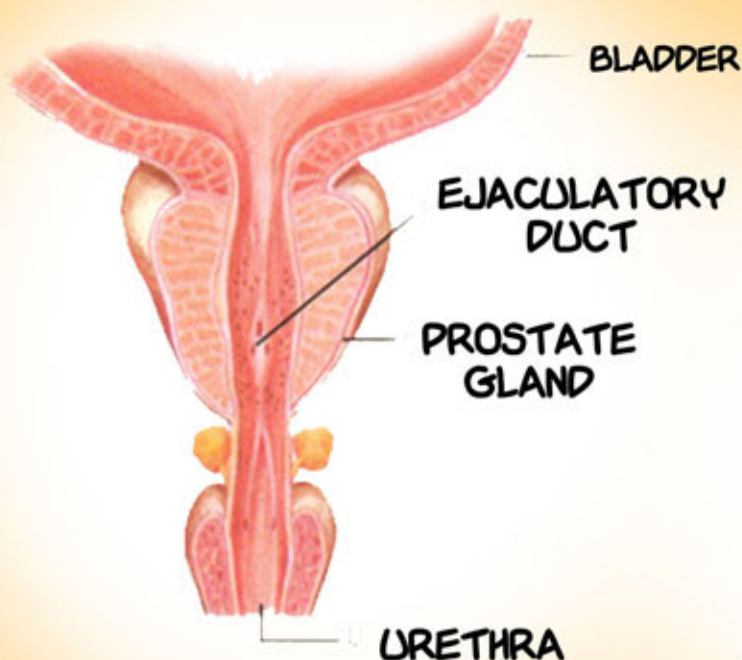
IF THE PASSAGE IS BLOCKED, SURGICAL REPAIR CAN BE ATTEMPTED BY PERFORMING A LONG AND COMPLICATED 2 TO 3 HOUR MICRO SURGERY CALLED A VASO-EPIDIDYMAL ANASTOMOSIS (VEA) . THIS IS HIGHLY SPECIALIZED SURGERY WHICH IS BEST DONE BY AN EXPERIENCED MICROSURGEON, SINCE THE TUBES INVOLVED ARE SO FINE AND DELICATE.



THIS IS TECHNICALLY DIFFICULT AND INTRICATE SURGERY BECAUSE IT NEEDS TO BE DONE UNDER HIGH MAGNIFICATION . THE SURGEON TRIES TO BYPASS THE BLOCK, SO THAT THE SPERM CAN REACH THE PENIS

SURGICAL RESULTS CAN BE POOR FOR THE FOLLOWING REASONS:

- TECHNICAL DIFFICULTY, BECAUSE OF THE MINUTE SIZE OF THE TUBES
- THESE SPERM ARE OFTEN POOR IN QUALITY AND ARE SUCCESSFUL IN GIVING RISE TO A PREGNANCY IN ONLY ABOUT 25% OF PATIENTS
- SECONDARY DAMAGE TO THE EPIDIDYMISS AND DUCT SYSTEM MAY HAVE OCCURRED SO THAT THEY NO LONGER WORK EFFECTIVELY AND SPERMS CANNOT MATURE HERE PROPERLY.



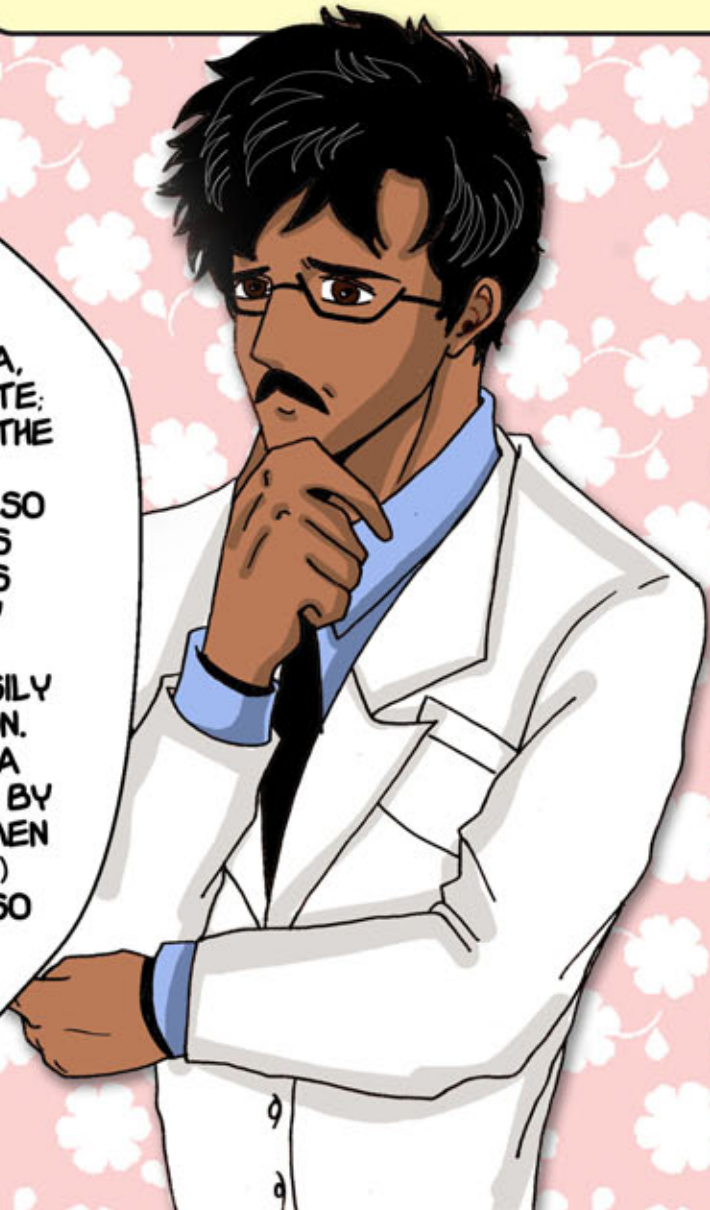
ONE OF THE UNCOMMON CAUSES OF OBSTRUCTIVE AZOOSPERMIA IS AN EJACULATORY DUCT OBSTRUCTION. THESE MEN HAVE LOW SEMEN VOLUME, NO FRUCTOSE IN THE SEMEN; AND AN ACIDIC SEMEN, BECAUSE THEIR SEMINAL VESICLES ARE BLOCKED

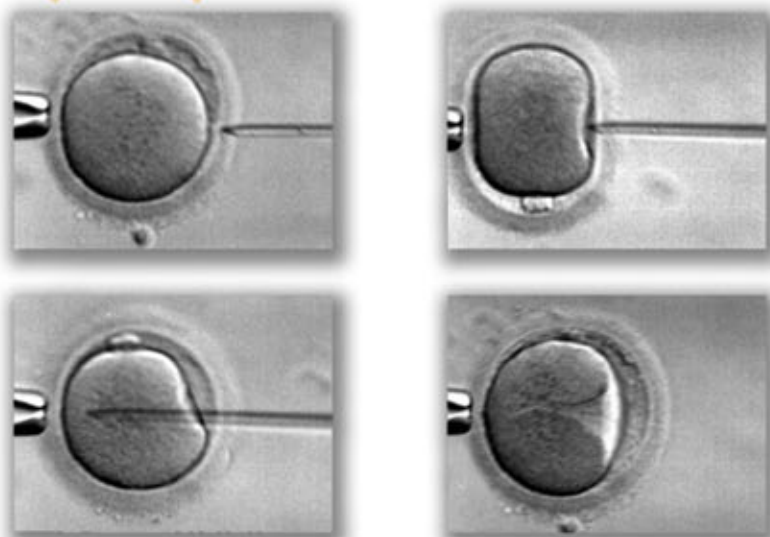




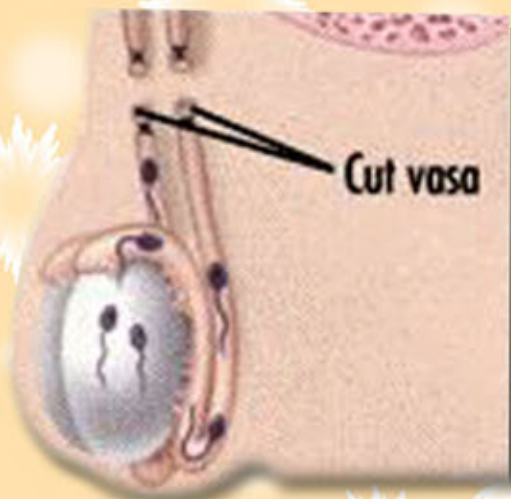
SOMETIMES, THIS IS BECAUSE OF AN EJACULATORY DUCT CYST, WHICH CAN BE DIAGNOSED BY TRUS (TRANSRECTAL ULTRASOUND). THIS CAN SOMETIMES BY TREATED BY A TURED (TRANSURETHRAL RESECTION OF THE EJACULATORY DUCT) PROCEDURE, WHICH IS PERFORMED BY PASSING AN ENDOSCOPE INTO THE URINARY BLADDER, BUT THE RESULTS OF SURGICAL REPAIR ARE OFTEN VERY POOR.

MEN WITH AN ABSENT VAS DEFERENS HAVE AZOOSPERMIA, WITH A LOW VOLUME EJACULATE; ACIDIC PH; AND NO FRUCTOSE IN THE SEMEN. THIS IS BECAUSE THEIR SEMINAL VESICLES ARE ALSO ABSENT. THE VAS DEFERENS IS ABSENT FROM BIRTH, BUT THIS PROBLEM IS DIAGNOSED ONLY WHEN THEY ARE TRYING TO CONCEIVE. THIS DIAGNOSIS IS EASILY MADE ON CLINICAL EXAMINATION. UNFORTUNATELY, IT IS OFTEN A DIAGNOSIS WHICH IS OVERLOOKED BY THE DOCTOR. MANY OF THESE MEN CARRY A CYSTIC FIBROSIS (CF) GENE MUTATION; AND MAY ALSO HAVE ASSOCIATED KIDNEY PROBLEMS.



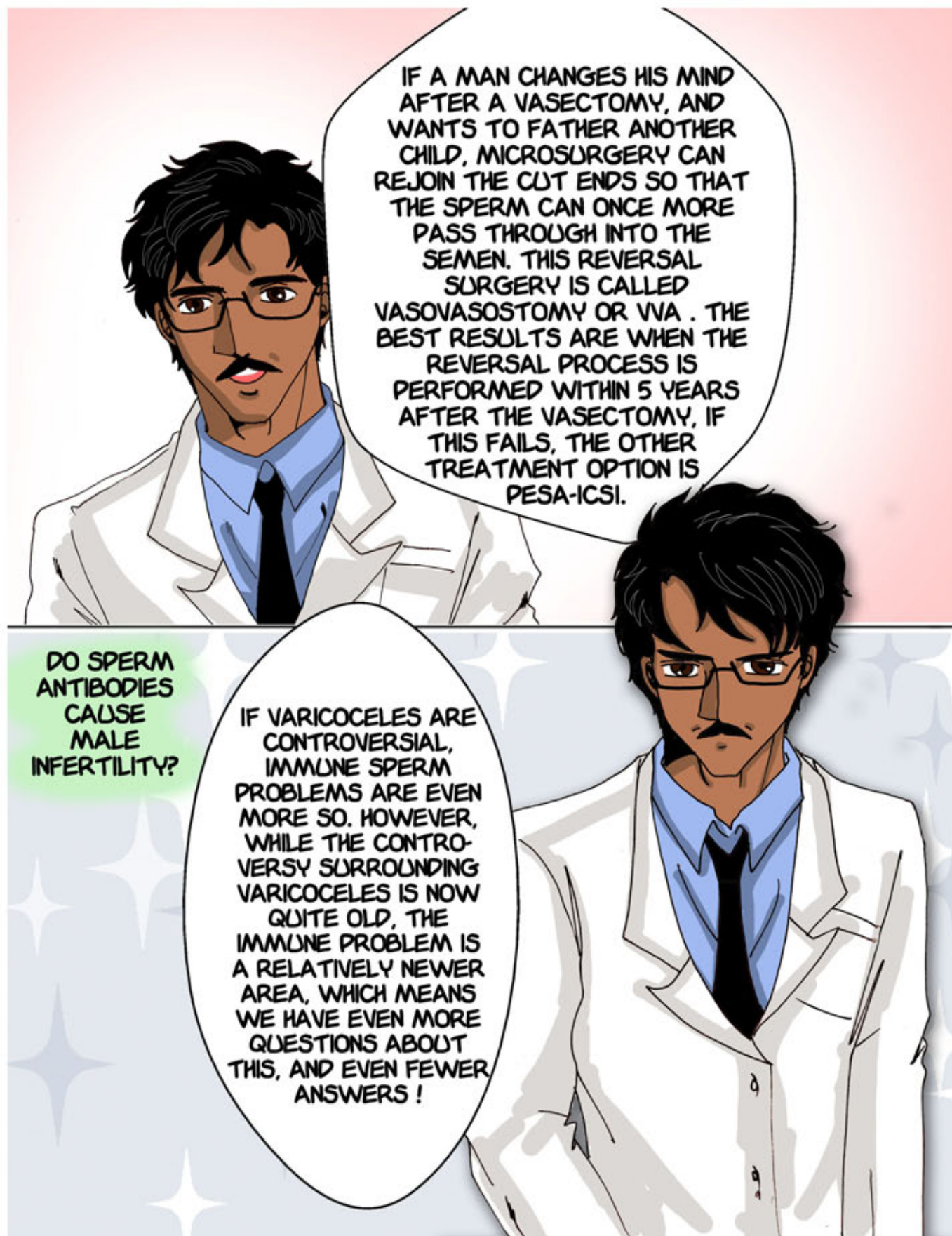


CONVENTIONAL TREATMENT IN THE PAST CONSISTED OF CREATING A POUCH SURGICALLY, INTO WHICH THE EPIDIDYMIS WAS MADE TO OPEN. THIS WAS CALLED A SPERMATOCELE AND SPERMS WERE ASPIRATED FROM THIS AND USED FOR ARTIFICIAL INSEMINATION. HOWEVER, PREGNANCY RATES WERE VERY POOR. THE TECHNIQUE OF PESA WITH ICSI HAS REVOLUTIONISED OUR APPROACH TO THESE MEN, AND ALLOWS MANY OF THEM TO FATHER A PREGNANCY.



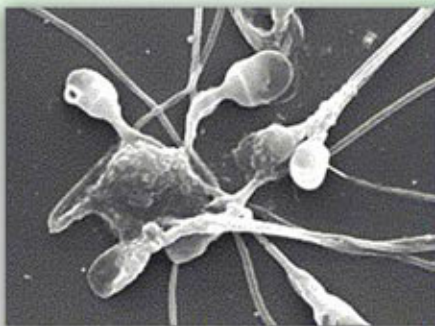
WHAT CAN A MAN WHO HAS HAD A VASECTOMY DO IF HE WANTS MORE CHILDREN ?

MEN OFTEN HAVE A VASECTOMY DONE TO RENDER THEM STERILE ONCE THEY HAVE COMPLETED THEIR FAMILY. THIS IS SAFE, EASY SURGERY WHICH INVOLVES CUTTING THE VAS DEFERENS (THE SPERM CARRYING TUBE) AND SEWING IT SHUT , SO THAT SPERM PASSAGE IS BLOCKED.

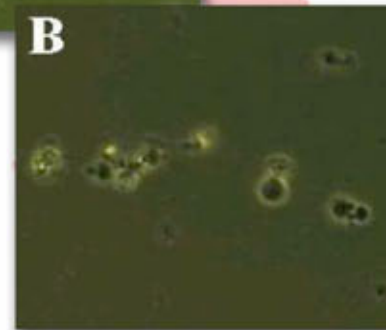
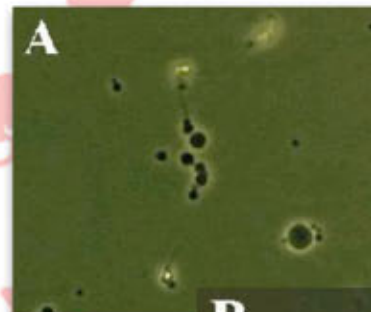




IN ONE OF NATURE'S QUIRKS, MEN CAN DEVELOP ANTIBODIES TO THEIR OWN SPERM. OR THE WIFE CAN DEVELOP THESE AGAINST THE HUSBAND'S SPERM. THE BODY'S DEFENSE MECHANISMS DESTROYS ITS OWN SPERM; OR THE WIFE'S HOSTILE CERVICAL MUCUS DOES SO, AS THOUGH THE SPERM WERE ENEMY BACTERIA OR VIRUS.



PROBLEMS START WITH MAKING A DIAGNOSIS. ANTISPERM ANTIBODIES ARE SUSPECTED WHEN THE SPERMS CLUMP TO ONE ANOTHER (AGGLUTINATE) ON A SPERM TEST. A POOR POSTCOITAL TEST, WHICH SHOWS ALL IMMOTILE SPERMS IN THE MUCUS IS ALSO A TIP-OFF.

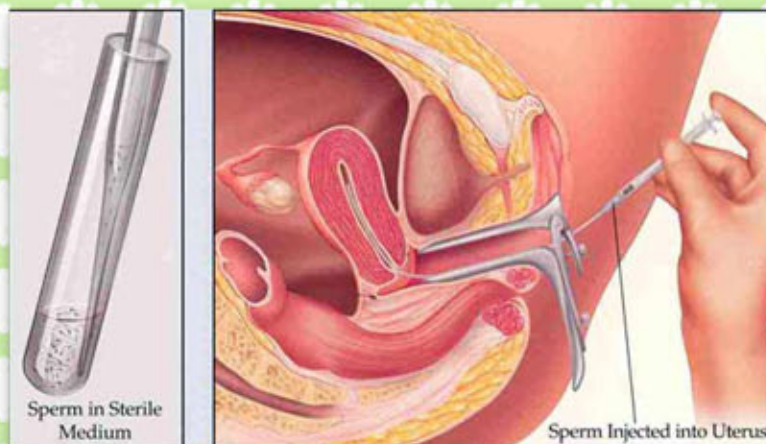


THERE ARE MANY TESTS AVAILABLE TO DETECT SPERM ANTIBODIES. BLOOD TESTS FOR ANTISPERM ANTIBODIES CAN BE DONE FOR BOTH THE WIFE AND HUSBAND USING ELISA METHODS. THESE TESTS ARE CONSIDERED TO BE OBSOLETE. THE NEWER ANTIBODY TESTS WHICH ARE MORE RELIABLE, ARE DONE ON THE SPERM ITSELF, USING IMMUNOBEAD TESTING. HOWEVER, INTERPRETING THE SIGNIFICANCE OF A POSITIVE RESULT REMAINS A VEXED ISSUE!



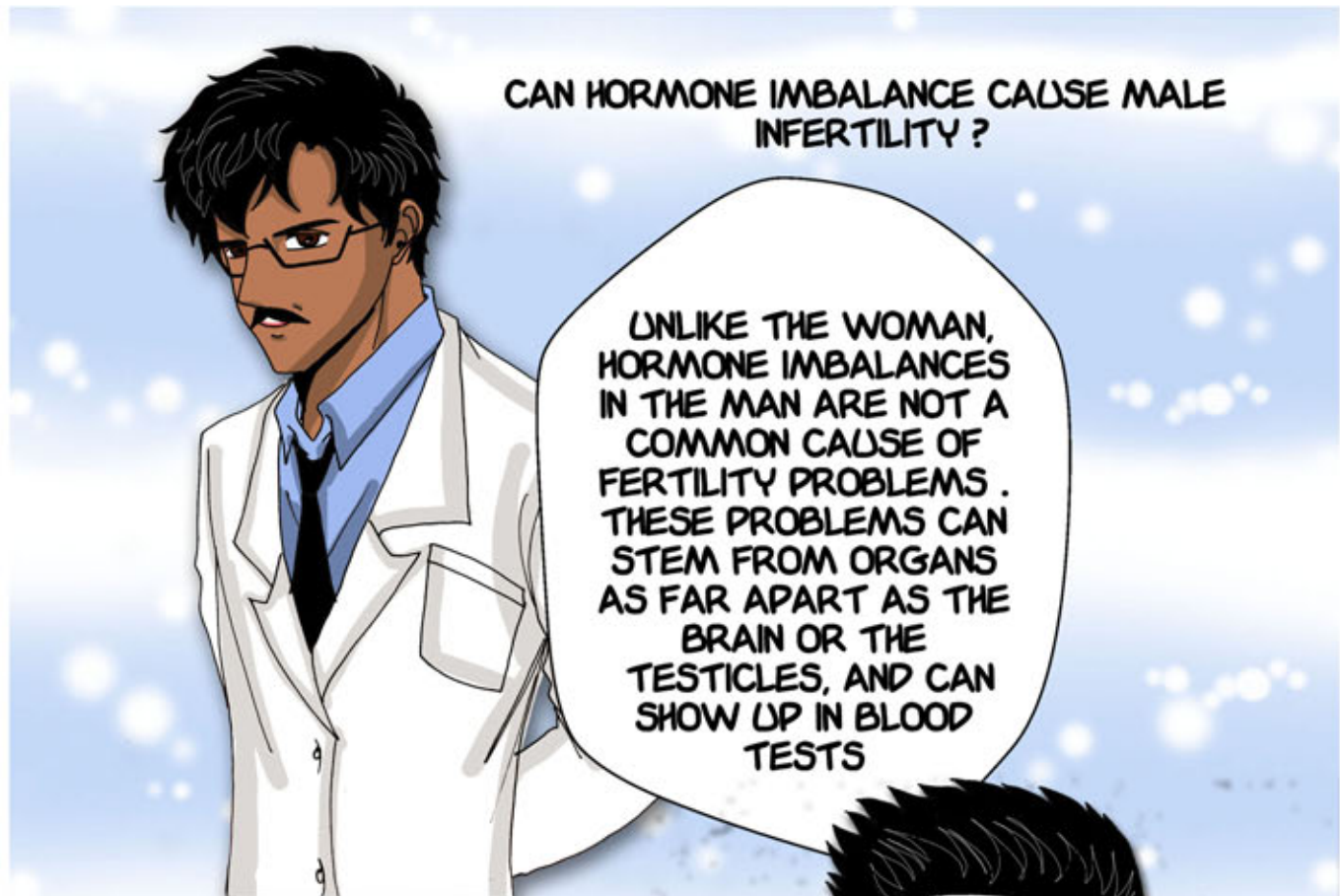


TREATMENT IS EQUALLY CONFUSING !
 THIS INCLUDED TESTOSTERONE INJECTIONS IN THE PAST IN ORDER TO SUPPRESS SPERM PRODUCTION IN THE BELIEF THAT IF THERE ARE NO SPERM , THERE WILL BE NO FURTHER FORMATION OF THE BATTLING ANTIBODIES ! CORTICOSTEROIDS HAVE ALSO BEEN USED SUCCESSFULLY TO STOP A PERSON FROM MAKING ANTIBODIES, BUT THESE DRUGS CAN HAVE SIGNIFICANT SIDE EFFECTS , AS A RESULT OF WHICH THEY ARE NOT CONSIDERED STANDARD THERAPY TODAY.



TODAY, WASHING THE SPERM IN THE LAB TO CLEAN AWAY THE SEMINAL FLUID WHICH CONTAINS THE ANTIBODIES , ALONG WITH TIMED INTRAUTERINE INSEMINATION (IUI) , IS THE FIRST-LINE TREATMENT. FOR OTHER PATIENTS, WHERE THE ANTIBODIES ARE TIGHTLY BOUND TO THE SPERM HEAD, IVF OR ICSI MAY BE NEEDED.





CAN HORMONE IMBALANCE CAUSE MALE INFERTILITY ?

UNLIKE THE WOMAN, HORMONE IMBALANCES IN THE MAN ARE NOT A COMMON CAUSE OF FERTILITY PROBLEMS . THESE PROBLEMS CAN STEM FROM ORGANS AS FAR APART AS THE BRAIN OR THE TESTICLES, AND CAN SHOW UP IN BLOOD TESTS

THEY CAN ARISE BECAUSE OF:

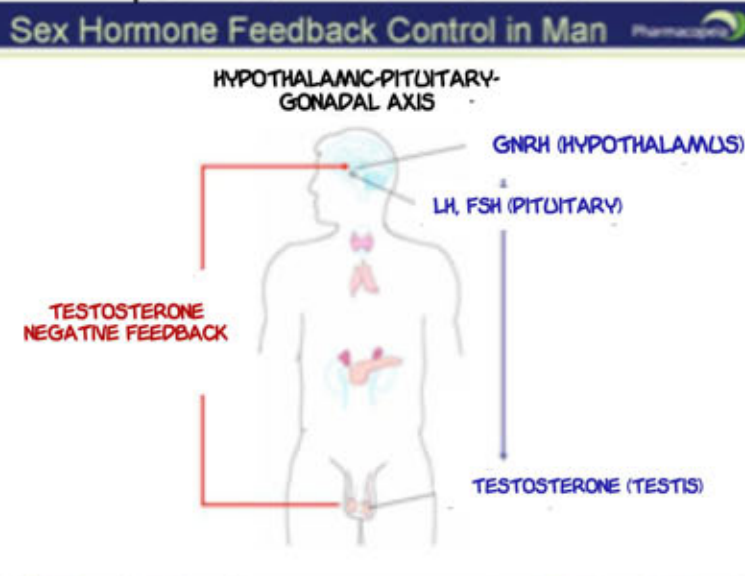
- HEAD INJURY
- A TUMOUR IN THE PITUITARY GLAND AT THE BASE OF YOUR BRAIN
- A TUMOR IN THE ADRENAL GLAND, ABOVE THE KIDNEYS.
- MALFUNCTIONING OF THE PITUITARY GLAND
- CIRRHOSIS OF THE LIVER
- CONDITIONS PRESENT FROM BIRTH, SUCH AS AND KLINEFELTER'S SYNDROME





ONE PROBLEM IS THAT OF HYPERPROLACTINAEMIA (A HIGH PROLACTIN LEVEL). THIS IS USUALLY CAUSED BY A PITUITARY MALFUNCTION OR TUMOUR; AND CAN BE DETECTED BY A BLOOD TEST. PATIENTS WITH HYPERPROLACTINEMIA OFTEN ALSO HAVE DECREASED LIBIDO AND MAY BE IMPOTENT. TREATMENT WITH BROMOCRYPTINE TO SUPPRESS THE HIGH PROLACTIN LEVELS IS HIGHLY SUCCESSFUL IN ACHIEVING PREGNANCY.

ANOTHER PROBLEM IS THAT OF HYPOGONADOTROPIC HYPOGONADISM (POOR FUNCTION OF THE TESTES BECAUSE OF INADEQUATE STIMULATION OF THE TESTES BY THE GONADOTROPIC HORMONES, FSH AND LH PRODUCED BY THE PITUITARY). MOST HYPOGONADOTROPIC PATIENTS HAVE POORLY DEVELOPED SECONDARY SEXUAL CHARACTERS; SCANTY HAIR; DECREASED LIBIDO, AND SMALL FLABBY TESTES. THIS CAN BE CONFIRMED BY BLOOD TESTS WHICH SHOW LOW LEVELS OF FSH AND LH.



THIS CAN BE TREATED BY REPLACEMENT THERAPY WITH THE GONADOTROPIN HORMONES - HCG AND HMG. THESE ARE EXPENSIVE INJECTIONS AND A FAIRLY LONG COURSE OF TREATMENT IS NEEDED FOR THEM TO WORK, BUT THEY ARE EFFECTIVE IN ENHANCING SPERM PRODUCTION IN THESE MEN.



HOW DOES SUBSTANCE ABUSE AFFECT MALE FERTILITY?

AS SHAKESPEARE SAID "ALCOHOL INCREASES THE DESIRE BUT TAKES AWAY THE PERFORMANCE." NOT ONLY ARE ALCOHOLICS UNABLE TO PERFORM, BUT THEIR LIVER FUNCTION ALSO DETERIORATES, RESULTING IN EXCESSIVE LEVELS OF THE FEMALE HORMONE, ESTROGEN, WHICH HAS A SEVERE SPERM SUPPRESSING EFFECT.

DRUGS OF ABUSE CAN ALSO CREATE MALFORMED SPERM WITH POOR MOTILITY; THEY ALSO ALTER HORMONAL BALANCE AND TESTICULAR FUNCTION; AND CAUSE IMPOTENCE AND ERECTION PROBLEMS.



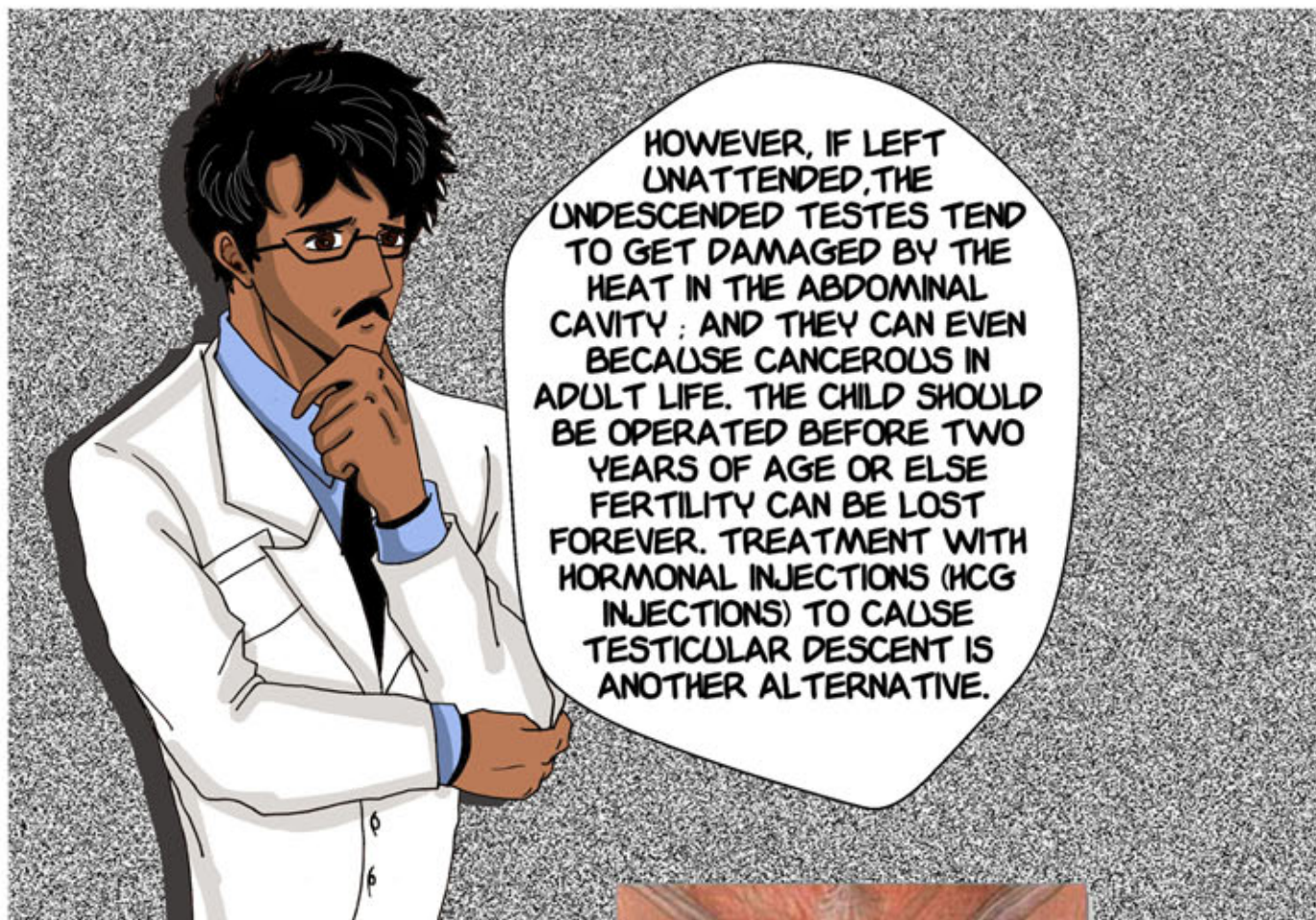


HOW DO UNDESCENDED TESTES CAUSE MALE INFERTILITY ?



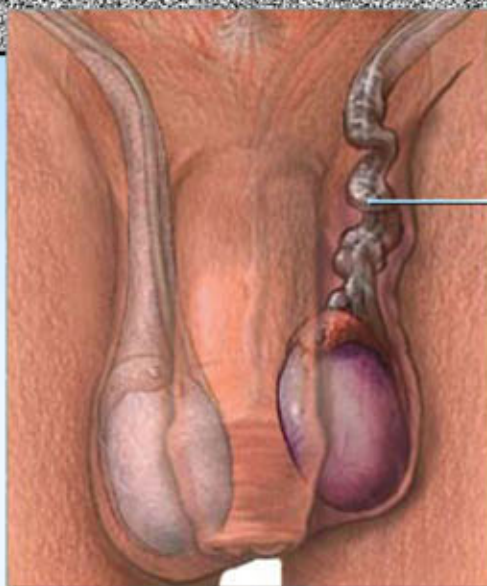
1. undescended testis
2. normal testis position
3. penis
4. scrotum
5. inguinal canal

UNDESCENDED TESTES ARE A TRAGIC CAUSE OF MALE INFERTILITY, SINCE THIS IS PREVENTABLE. SOME BABIES ARE BORN WITH ONE OR BOTH TESTICLES UP IN THEIR BELLIES INSTEAD OF HANGING DOWN IN THE SCROTUM. SOMETIMES THE CONDITION MIGHT CORRECT ITSELF BY THE TIME THE TODDLER IS AROUND 2 YEARS.



HOW DOES TESTICULAR TORSION CAUSE MALE INFERTILITY ?

IF ONE OF THE TESTICLES HAS UNDERGONE TORSION, IT COULD BE DAMAGED SINCE IT IS STARVED OF BLOOD. SIGNS OF TORSION ARE AN EXCRUCIATING PAIN AND SWELLING OF THE TESTICLE. SADLY, IT IS OFTEN MISDIAGNOSED AS A TESTES INFECTION, AND LEFT UNTREATED. THIS CAUSES THE TESTIS ON THAT SIDE TO SHRIVEL UP AND DIE (ATROPHY). THE BEST WAY TO MAKE THE DIAGNOSIS OF TORSION IS WITH A DOPPLER ULTRASOUND ; AND EMERGENCY SURGERY IS NEEDED RIGHT AWAY,



TWISTED SPERMATIC CORD

TO UNTWIST AND FIX THE TESTIS. THE OTHER TESTIS MUST ALSO ALWAYS BE FIXED SURGICALLY TO PREVENT IT FROM UNDERGOING TORSION .





WHICH INFECTIONS CAUSE MALE INFERTILITY ?

THE COMMONEST REASON FOR AZOOSPERMIA IN INDIA USED TO BE SMALLPOX - THE VIRUS ATTACKS AND DAMAGES THE EPIDIDYMIS, CAUSING DUCTAL OBSTRUCTION. TUBERCULOSIS ALSO DAMAGES THE EPIDIDYMIS, CAUSING AZOOSPERMIA. HOWEVER, MAKING A SPECIFIC DIAGNOSIS OF TUBERCULOUS EPIDIDYMITIS CAN BE VERY DIFFICULT, BECAUSE IT IS OFTEN A SILENT AND INDOLENT DISEASE. GONORRHEA, CHLAMYDIA, SYPHILIS AND OTHER STDs CAN ALSO PLAY HAVOC WITH THE MALE GENITAL TRACT; CAUSING IRREPARABLE DAMAGE TO ITS EPITHELIUM

MUMPS CAN ALSO CAUSE ORCHITIS (INFLAMMATION OF THE TESTIS) - ESPECIALLY WHEN IT AFFECTS YOUNG MEN. THIS CAN CAUSE SEVERE DAMAGE TO THE TESTES, RESULTING IN TESTICULAR FAILURE



WHAT ABOUT OTHER GENITAL TRACT INFECTIONS?



MANY DOCTORS WILL DO A SEMEN CULTURE, TO LOOK FOR A TREATABLE CAUSE OF INFERTILITY, IF THE SEMEN SAMPLE SHOWS MANY PUS CELLS. IF THE TEST IS POSITIVE TREATMENT WITH ANTIBIOTICS IS INSTITUTED. MALE REPRODUCTIVE TRACT INFECTIONS ARE OFTEN CHRONIC, AND MAY REQUIRE MANY WEEKS OF ANTIBIOTIC TREATMENT. HOWEVER, THE RELATION BETWEEN THE PRESENCE OF BACTERIA IN THE SEMEN AND MALE INFERTILITY IS STILL UNCLEAR

WHICH MEDICATIONS CAN CAUSE MALE INFERTILITY ?

MEDICATION AND ITS EFFECTS
SOME MEDICATIONS CAN PLAY HAVOC WITH THE SPERM COUNT OR WITH THE SEX DRIVE. THESE INCLUDE :DRUGS FOR HIGH BLOOD PRESSURE LIKE RESERPINE, METHYLDOPA, GUANETHIDINE, AND PROPRANOLOL; NITROFURANTOIN FOR URINARY INFECTION; CORTICOSTEROIDS; ANABOLIC STEROIDS FOR MUSCLE BUILDING; AND ANTI PSYCHOTIC DRUGS





A RARE PROBLEM IS THAT OF ANTI CANCER DRUGS AND RADIATION THERAPY - USED TO TREAT YOUNG MEN WITH HODGKIN'S DISEASE, LYMPHOMA, LEUKEMIA AND TESTICULAR TUMOURS. IN THESE MEN, THE CHEMOTHERAPY AND RADIATION THERAPY USED TO TREAT THE DISEASE ALSO WIPES OUT SPERM PRODUCTION, RENDERING THEM STERILE

AN OPTION AVAILABLE TODAY IS TO STORE THE SPERMS (SPERM BANKING). THESE SPERM CAN THEN BE USED LATER FOR ICSI TO HELP THE WIFE TO ACHIEVE A PREGNANCY.



DOES HEAT CAUSE MALE INFERTILITY ?

THE TESTICLES ARE IN THE SCROTUM BECAUSE THEY CAN'T MAKE SPERM AT BODY TEMPERATURE - THEY NEED A COOLER ENVIRONMENT, SO THEY HANG OUTSIDE THE BODY WHERE THE TEMPERATURE IS 0.8 DEGREES CENTIGRADE COOLER. TIGHTLY ENCASED GROINS, HOT TUB BATHS AND SAUNAS, AND HOT SEDENTARY JOBS MAY ALSO CAUSE A LOWER SPERM COUNT AS YOUR TESTICLES GET TOO HOT.



WHAT
EJACULATORY
PROBLEMS CAN
CAUSE MALE
INFERTILITY?



VERY OFTEN A PERFECTLY FERTILE MAN MAY NOT BE ABLE TO EJACULATE. SINCE HE CAN'T MAKE LOVE HE CAN'T MAKE BABIES. SOME MEN CAN'T HAVE AN ERECTION AND SOME CANNOT ACHIEVE AN ERECTION SUFFICIENT FOR INTRAVAGINAL PENETRATION OR EJACULATION IN THE VAGINA.



AN OLDER THEORY HELD THAT 80% OF IMPOTENCY PROBLEMS WERE ROOTED IN PSYCHOLOGICAL FEARS WHICH COULD RESPOND TO SEX THERAPY AND COUNSELLING. HOWEVER MODERN RESEARCH HAS LOWERED THIS FIGURE AND ESTIMATES THAT 50% ARE DUE TO PHYSICAL CAUSES RANGING FROM INADEQUATE BLOOD FLOW TO THE PENIS, DIABETES, NEUROLOGIC DEFECTS, AND HORMONAL PROBLEMS.

HOW DOES THE
DOCTOR SUSPECT A
PHYSICAL PROBLEM?

BY ASKING A SIMPLE QUESTION - DO YOU HAVE WET DREAMS? IF MEN HAVE NOCTURNAL EJACULATIONS (WET DREAMS) THIS WOULD SUGGEST THAT THE PHYSICAL APPARATUS IS SOUND, AND THAT THE PROBLEM IS PSYCHOLOGICAL.

STAMPS



TESTING INCLUDES NOCTURNAL PENILE TUMESCENCE (NPT) TESTING, WHICH MONITORS FOR NORMAL NIGHT-TIME ERECTIONS. YOU CAN ALSO DO THIS YOURSELF USING THE POSTAGE STAMP TEST. BLOOD FLOW THROUGH THE ARTERIES OF THE PENIS CAN ALSO BE MEASURED (USING DOPPLER ULTRASOUND)

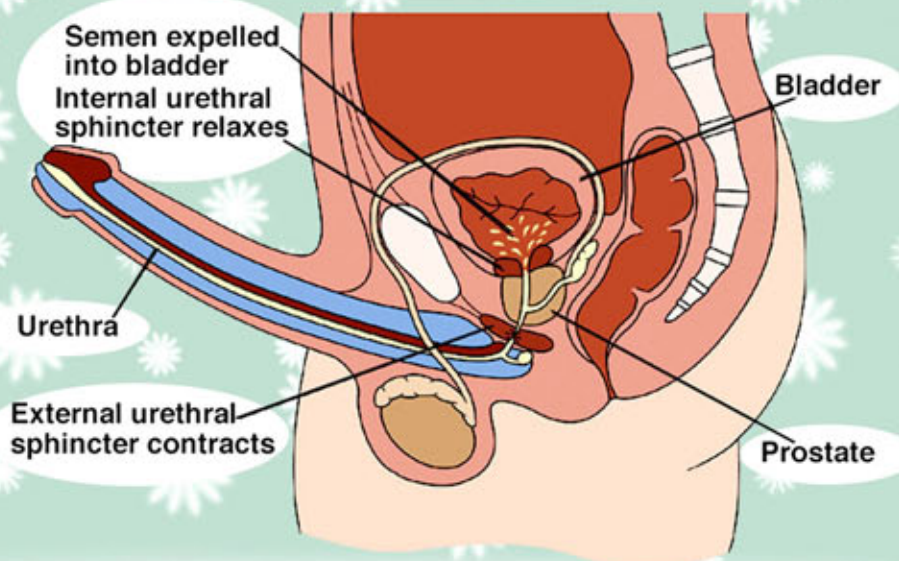
TREATMENT THAT MAY BE PRESCRIBED INCLUDES:

- DRUGS SUCH AS VIAGRA (SILDENAFIL CITRATE) OR CIALIS (TADALAFIL CITRATE) , TO INDUCE AN ERECTION.
- INJECTIONS OF PAPAVERINE AND PROSTAGLANDINS , (CHEMICALS WHICH CAUSE BLOOD VESSEL TO DILATE)CAN BE SELF- INJECTED INTO THE PENIS UNDER MEDICAL SUPERVISION .THESE SUBSTANCE INCREASE THE BLOOD FLOW TO THE PENIS, THUS CREATING AN ERECTION.
- A SURGICAL IMPLANT OR PENILE PROSTHESIS TO GIVE AN ARTIFICIAL ERECTION.
- MICROSURGERY TO PLUG LEAKS IN THE VEINS OF THE PENIS, THUS PREVENTING THE LOSS OF TURGIDITY OF THE ERECT PENIS.

THE SPERMS CAN ALSO BE COLLECTED BY MASTURBATION AND USED FOR ARTIFICIAL INSEMINATION OR SELF-INSEMINATION THIS HAS A VERY HIGH SUCCESS RATE BECAUSE THERE IS REALLY NO FERTILITY PROBLEM FOR THESE PATIENTS.



Retrograde Ejaculation



THIS MEANS THAT THE SEMEN GOES BACKWARDS INTO THE BLADDER INSTEAD OF COMING OUT OF THE PENIS, SO THAT VERY LITTLE OR NO SEMEN IS EJACULATED AT THE TIME OF ORGASM AND THE URINE LOOKS CLOUDY AFTER HAVING SEX. THIS OCCURS WHEN THE BLADDER SPHINCTER MUSCLE DOES NOT CONTRACT PROPERLY DURING ORGASM, AS A RESULT OF WHICH THE SEMEN LEAKS BACK FROM THE URETHRA INTO THE BLADDER. THIS COULD BE CAUSED BY PROSTATE SURGERY, A SPINAL INJURY, DIABETES, HIGH BLOOD PRESSURE MEDICATION AND BIRTH DEFECTS.



A SIMPLE WAY TO DIAGNOSE RETROGRADE EJACULATION IS TO EXAMINE A MAN'S URINE AFTER HE EJACULATES. IF THERE ARE SPERM IN THE URINE, THIS CONFIRMS THE DIAGNOSIS.



SELF-HELP INCLUDES TRYING TO HAVE SEX WITH A FULL BLADDER AND WHILE STANDING UP, BECAUSE THIS MAKES THE MUSCLE AROUND THE OPENING OF THE BLADDER MORE LIKELY TO STAY CLOSED. SOME MEDICATIONS LIKE DECONGESTANTS CAN ALSO HELP THE SPHINCTER MUSCLE TO CLOSE. SURGERY CAN ALSO BE PERFORMED ON THE OPENING OF THE BLADDER TO PREVENT IT FROM MISBEHAVING, BUT THIS IS NOT VERY SUCCESSFUL.



AN EFFECTIVE TREATMENT OPTION IS TO COLLECT THE SPERM AND USE IT FOR ARTIFICIAL INSEMINATION. AFTER PASSING URINE, THE MAN ALKALINIZES HIS URINE BY DRINKING SODIUM BICARBONATE, AND THEN URINATES IMMEDIATELY AFTER EJACULATION. THE RECOVERED SPERM IN THE URINE ARE PROCESSED AND USED FOR INSEMINATION. PREGNANCY RATES WITH INSEMINATION MAYBE LOW BECAUSE THE RECOVERED SPERM ARE OFTEN OF POOR QUALITY

SOMETIMES IVF NEEDS TO BE DONE WITH THESE SPERM TO GIVE A REASONABLE CHANCE OF PREGNANCY.

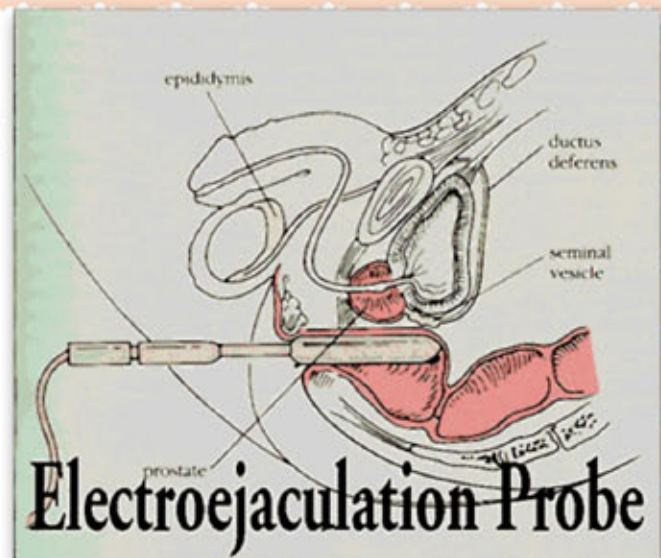


WHAT IS ANEJACULATION ?

SOME MEN FIND THAT THEY CAN GET AN ERECTION, BUT THEY ARE UNABLE TO EJACULATE. THIS IS AN UNCOMMON PROBLEM, AND IS OFTEN NOT DIAGNOSED CORRECTLY, BECAUSE MANY DOCTORS DON'T CONSIDER THIS DIAGNOSTIC POSSIBILITY. THIS IS CALLED ASPERMIA, BUT BECAUSE IT IS SO UNCOMMON, MOST OF THESE MEN ARE MISDIAGNOSED AS HAVING AZOOSPERMIA ! MOST OF THESE MEN CAN BE HELPED BY TEACHING THEM TO USE A VIBRATOR IN ORDER TO EJACULATE.

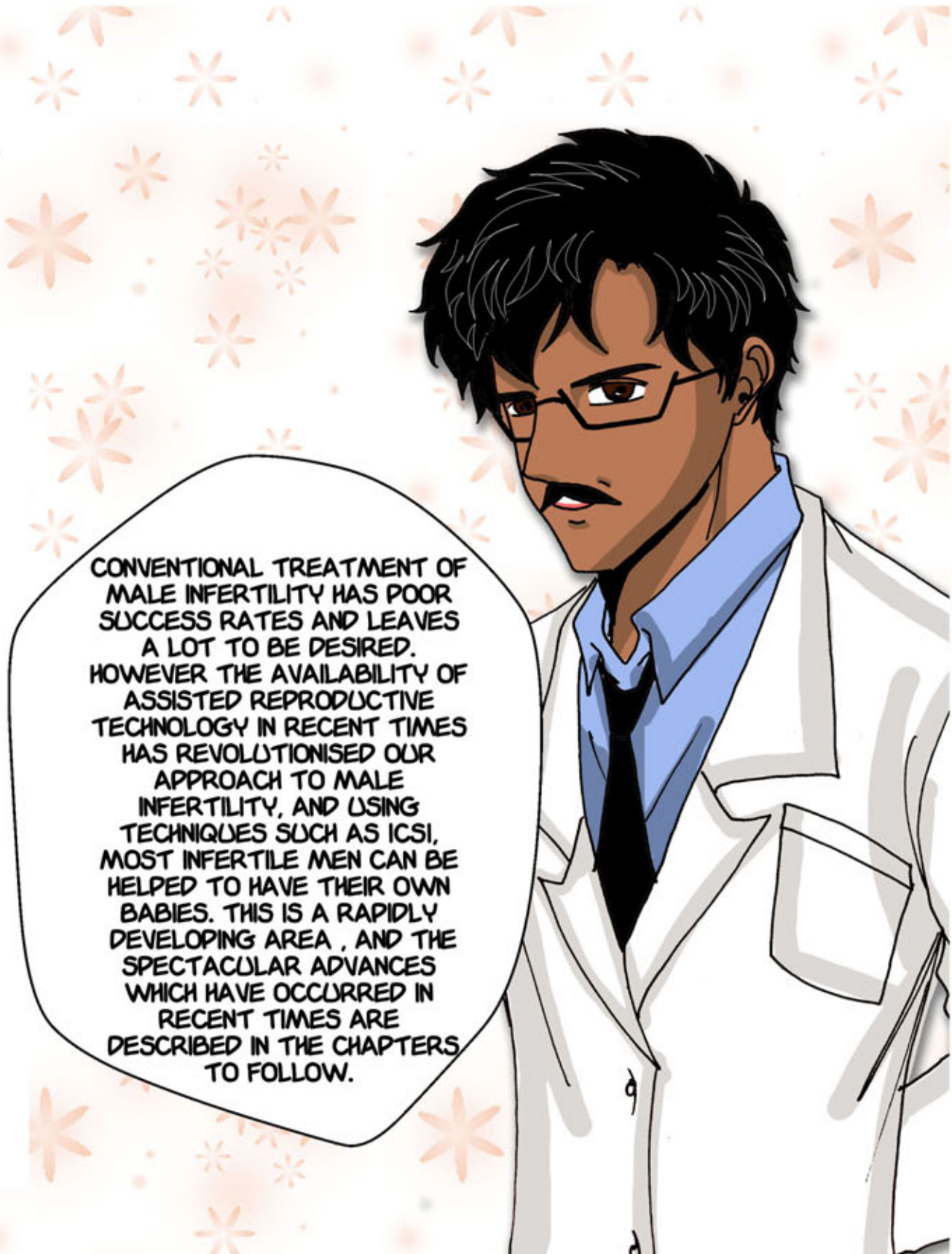
WHAT IS ELECTROEJACULATION ?

ELECTROEJACULATION FOR SPINAL CORD PROBLEMS MEN WITH SPINAL CORD PROBLEMS CANNOT EJACULATE BECAUSE OF NEUROLOGIC DAMAGE. THEY CAN NOW BE HELPED TO FATHER A PREGNANCY WITH THE HELP OF A TECHNIQUE CALLED ELECTROEJACULATION. A PROBE IS INSERTED INTO THE MAN'S RECTUM (UNDER GENERAL ANESTHESIA) AND ELECTRICAL STIMULATION DELIVERED TO THE PROSTATE IN A GRADUALLY INCREASING FASHION TO INDUCE AN EJACULATION. THE MAN USUALLY ATTAINS AN ERECTION AND EJACULATES IN ABOUT FIVE MINUTES. THE RECOVERED SPERM CAN THEN BE USED FOR IUI, IVF OR ICSI, DEPENDING UPON THEIR QUALITY (WHICH IS USUALLY POOR).





TREATING THE COUPLE IF THE MAN HAS A LOW SPERM COUNT, SINCE SO LITTLE CAN BE DONE WITH CONVENTIONAL THERAPY TO IMPROVE THE SPERM COUNT, TODAY WE USUALLY OFFER THEM ONE OF THE ASSISTED REPRODUCTIVE TECHNOLOGIES. THIS MIGHT SEEM UNFAIR, SINCE THE WIFE IS BEING TREATED FOR WHAT IS ESSENTIALLY THE HUSBAND'S PROBLEM ! THE FERTILITY OF THE COUPLE IS THE SUM OF THE FERTILITY POTENTIAL OF BOTH THE PARTNERS, AND BECAUSE IT'S EASIER TO IMPROVE THE WOMAN'S FERTILITY, A MALE FACTOR PROBLEM CAN OFTEN BE TREATED BY TREATING THE WIFE !



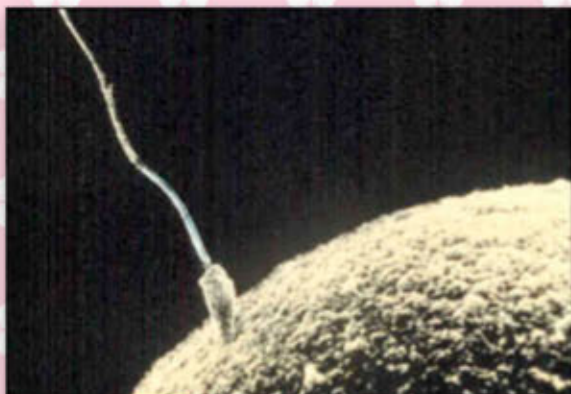
WHY IS TREATMENT OF A LOW SPERM COUNT SO CONFUSING ?

MANY INFERTILE MEN ARE OBSESSED ABOUT THEIR SPERM COUNT - AND THIS SEEMS TO BECOME THE CENTRAL CONCERN IN THEIR LIVES. THE REAL QUESTION THE INFERTILE MAN IS ASKING IS NOT: WHAT IS MY SPERM COUNT OR MOTILITY OR WHATEVER? CAN I HAVE A BABY WITH MY SPERM? SINCE THE FUNCTION OF THE SPERM IS TO FERTILIZE THE EGG, THE ONLY DIRECT WAY OF ANSWERING THIS QUESTION IS BY ACTUALLY DOING IVF FOR TEST FERTILIZATION.



THE MAJOR PROBLEM WITH ALL SPERM FUNCTION TESTS, IS THAT THEY ARE ALL INDIREC. THERE IS NO VERY GOOD CORRELATION BETWEEN TEST RESULTS, PREGNANCY RATES, AND FERTILIZATION IN VITRO FOR THE INDIVIDUAL PATIENT. THIS IS WHY WE FIND THAT DIFFERENT DOCTORS GIVE SUCH WIDELY VARYING INTERPRETATIONS BASED ON THE SAME SPERM REPORT.





THIS IS REALLY NOT SURPRISING WHEN YOU CONSIDER HOW ABYSMAL OUR IGNORANCE IN THIS AREA IS - AFTER ALL, WE DO NOT EVEN KNOW WHAT A "NORMAL" SPERM COUNT IS! ! WHILE THE LOWER LIMIT OF NORMAL IS CONSIDERED TO BE 10 MILLION PROGRESSIVELY MOTILE SPERM PER ML, REMEMBER THAT THIS IS A STATISTICAL AVERAGE.

FOR EXAMPLE, MOST DOCTORS HAVE HAD THE EXPERIENCE OF A MAN WITH A VERY LOW SPERM COUNT (AS LITTLE AS 2-5 MILLION PER ML) FATHERING A PREGNANCY ON HIS OWN, WITH NO TREATMENT. THIS OBVIOUSLY MEANS THAT THERE IS A SIGNIFICANT VARIATION IN "FERTILE" SPERM COUNTS, AND THEREFORE COMING TO CONCLUSIONS IS VERY DIFFICULT FOR THE DOCTOR (LEAVE ALONE THE PATIENT!)

WE'RE PREGNANT!



IN ORDER TO MAKE SENSE OF THIS, YOU NEED TO UNDERSTAND TWO IMPORTANT CONCEPTS - "TRYING TIME" AND "FERTILITY POTENTIAL OF THE COUPLE". IF YOUR SPERM COUNT IS LOW, BUT YOU HAVE BEEN TRYING TO HAVE A BABY FOR LESS THAN 1 YEAR, IT STILL MAKES SENSE TO KEEP ON TRYING FOR ABOUT 1 YEAR, SINCE 10% OF MEN WITH LOW SPERM COUNTS WILL FATHER A PREGNANCY IN THIS TIME.

IF HOWEVER, YOU HAVE ALREADY TRIED FOR MORE THAN 2 YEARS WITH NO SUCCESS, YOU NEED TO MOVE ON AND DO SOMETHING MORE - THE CHANCES OF A SPONTANEOUS PREGNANCY ARE NOW VERY LOW. REMEMBER, THAT A DOCTOR DOES NOT TREAT JUST A "LOW SPERM COUNT REPORT" - HE TREATS PATIENTS!



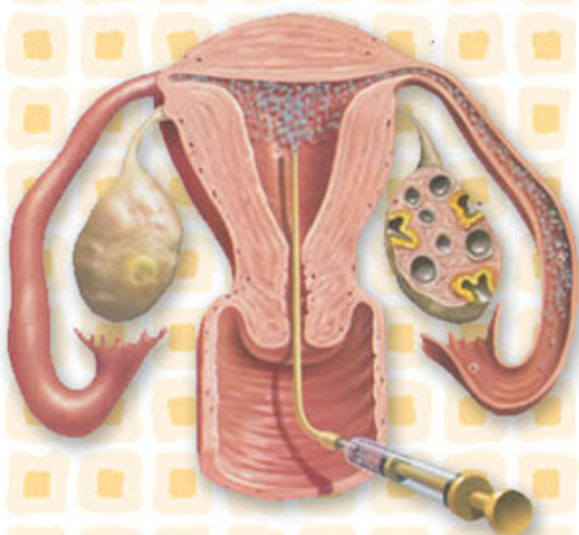
WHAT CAN
THE MAN WITH
A LOW SPERM
COUNT DO ?



UNFORTUNATELY, THERE
IS NO METHOD OF
INCREASING THE SPERM
COUNT TODAY! THE
MODERN PROTOCOL FOR
MANAGING MALE
INFERTILITY IS BASED ON
THE MAN'S MOTILE SPERM
COUNT; AND ON A SIMPLE
TEST, CALLED A SPERM
SURVIVAL TEST WHERE
THE SPERM ARE WASHED
AND THEN KEPT IN
CULTURE MEDIUM IN THE
INCUBATOR FOR 24 HOURS
AND THEN RECHECKED.

IF THERE ARE MORE THAN
3 MILLION MOTILE SPERM
PER ML AFTER 24 HOURS,
THIS IS REASSURING. IF,
HOWEVER, NONE OF THE
SPERM IS ALIVE, THIS
SUGGESTS THAT THEY
MAY BE FUNCTIONALLY
INCOMPETENT

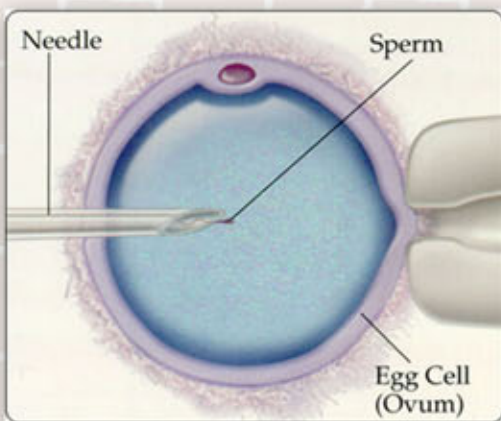




TREATMENT DEPENDS UPON HOW LOW THE COUNT IS. IF IT IS ONLY MODERATELY DECREASED IT MAKES SENSE TO TRY TO IMPROVE THE FERTILITY POTENTIAL OF THE WIFE, AND THE EASIEST TREATMENT IS SUPEROVULATION PLUS INTRAUTERINE INSEMINATION. IF AFTER DOING THIS AND TRYING FOR 4 TREATMENT CYCLES (4 IS THE "MAGIC" NUMBER BECAUSE MOST PATIENTS WHO ARE GOING TO BECOME PREGNANT WITH ANY METHOD WILL USUALLY DO SO WITHIN 4 CYCLES) NO PREGNANCY ENSUES, YOU NEED TO GO ON AND EXPLORE FURTHER ALTERNATIVES, SUCH AS IVF OR ICSI.

FOR MEN WITH A MOTILE SPERM COUNT OF MORE THAN 5 MILLION IN THE EJACULATE, IVF WOULD BE THE FIRST TREATMENT OFFERED. THIS WOULD ALLOW US TO DOCUMENT IF THE SPERM CAN FERTILIZE THE EGGS OR NOT. IF FERTILISATION IS DOCUMENTED, THEN THE PATIENT HAS A GOOD CHANCE OF GETTING PREGNANT.



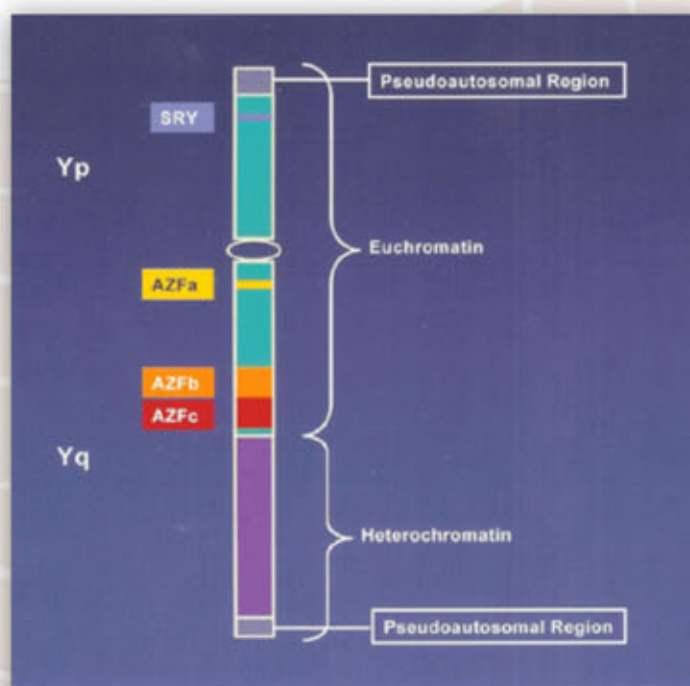


HOWEVER, IF THE MOTILE SPERM COUNT IS LESS THAN 5 MILLION, OR IF THERE IS TOTAL FAILURE OF FERTILISATION IN IVF, THEN THE ONLY TREATMENT AVAILABLE IS ICSI OR MICROINJECTION. ICSI HAS REVOLUTIONISED OUR APPROACH TO THE INFERTILE MAN, AND IT PROMISES THE POSSIBILITY FOR EVERY MAN TO HAVE A BABY, NO MATTER HOW LOW HIS SPERM COUNT.

WHY DO I HAVE A LOW SPERM COUNT ?

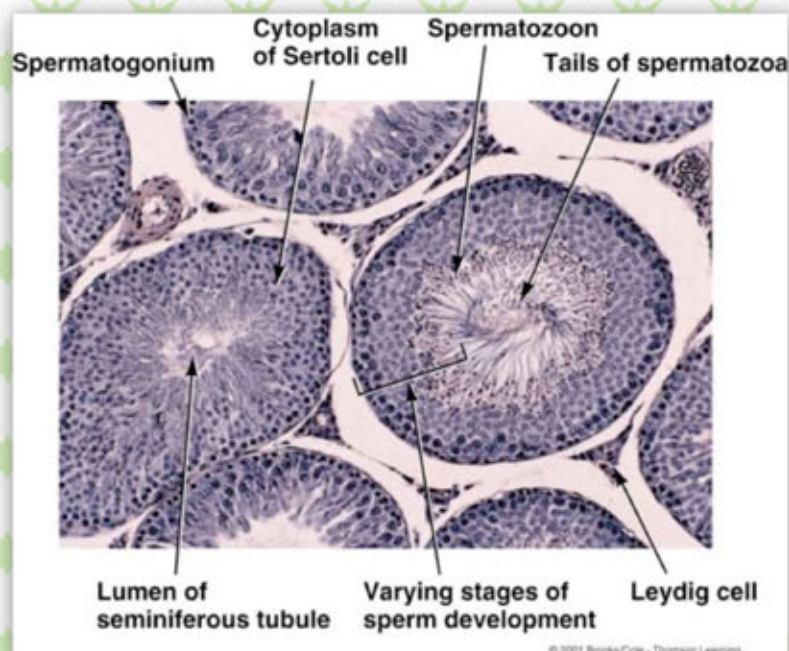
UNFORTUNATELY, NINE TIMES OUT OF TEN, THE DOCTOR WILL NOT BE ABLE TO ANSWER THAT QUESTION, AND NO AMOUNT OF TESTING WILL HELP US TO FIND OUT - THIS IS LABELLED AS "IDIOPATHIC OLIGOSPERMIA" WHICH IS REALLY A WASTEPAPER BASKET DIAGNOSIS FOR "GOD ONLY KNOWS!".

MODERN RESEARCH HAS SHOWN THAT THE REASON SOME MEN HAVE A LOW SPERM COUNT MAYBE BECAUSE OF A MICRODELETION ON THE Y-CHROMOSOME. WE DO KNOW THAT A LOW SPERM COUNT IS NOT RELATED TO PHYSIQUE, GENERAL STATE OF HEALTH, DIET, SEXUAL APPETITE OR FREQUENCY. WHILE NOT KNOWING THE CAUSE CAN BE VERY FRUSTRATING, MEDICINE STILL HAS A LOT TO STUDY AND UNDERSTAND ABOUT MALE INFERTILITY, WHICH IS A RELATIVELY NEGLECTED FIELD TODAY.



THE MAJOR CAUSE OF MALE INFERTILITY USUALLY IS A SPERM PROBLEM. HOWEVER, DO REMEMBER THAT THIS IS NO REFLECTION ON YOUR LIBIDO OR SEXUAL PROWESS. SOMETIMES MEN WITH TESTICULAR FAILURE FIND THIS DIFFICULT TO UNDERSTAND

BUT DOCTOR, I HAVE SEX TWICE A DAY! HOW CAN MY SPERM COUNT BE ZERO?



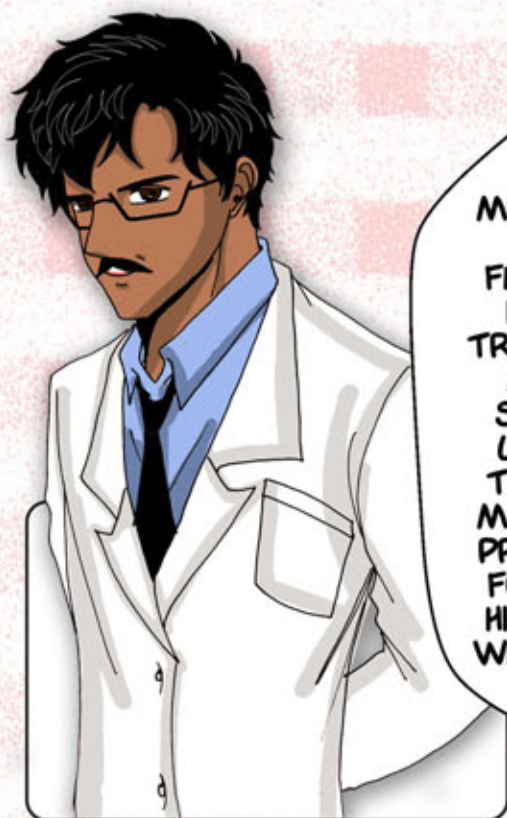
THE REASON FOR THIS IS THAT THE TESTIS HAS TWO COMPARTMENTS. ONE COMPARTMENT, THE SEMINIFEROUS TUBULES, PRODUCES SPERMS. THE OTHER COMPARTMENT, THE "INTERSTITIUM" (WHERE THE LEYDIG CELLS ARE) PRODUCES THE MALE SEX HORMONE, TESTOSTERONE, WHICH CAUSES THE MALE SEXUAL DRIVE. NOW WHILE THE SPERM PRODUCTION COMPARTMENT CAN BE EASILY DAMAGED, THE LEYDIG CELLS USUALLY CONTINUE FUNCTIONING NORMALLY IN MOST PATIENTS WITH TESTICULAR FAILURE.



THIS IS WHY THE DIAGNOSIS OF A LOW SPERM COUNT CAN BE SUCH A BLOW TO ONE'S EGO -- IT IS SO TOTALLY UNEXPECTED, BECAUSE IT IS NOT ASSOCIATED WITH OTHER SYMPTOMS OR SIGNS. COMMON FEELINGS INCLUDE ANGER WITH THE WIFE AND THE DOCTOR; RESENTMENT ABOUT HAVING TO TAKE TREATMENT SINCE THEY FEEL HAVING BABIES IS THE WOMAN'S "JOB"; LOSS OF SELF-ESTEEM; AND TEMPORARY SEXUAL DYSFUNCTION SUCH AS LOSS OF DESIRE AND POOR ERECTIONS. MANY MEN ALSO FEEL GUILTY THAT THEY ARE DEPRIVING THEIR WIFE THE PLEASURES OF EXPERIENCING MOTHERHOOD BECAUSE OF "THEIR" MEDICAL PROBLEM.

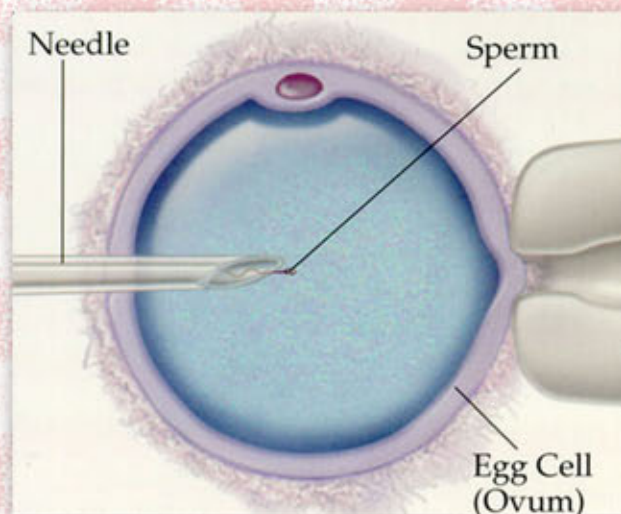
UNFORTUNATELY, SOCIAL SUPPORT FOR THE INFERTILE MAN IS PRACTICALLY NON-EXISTENT, AND HE IS FORCED TO PUT UP A BRAVE FRONT SINCE HE IS A MAN, HE IS NOT ALLOWED TO DISPLAY HIS EMOTIONS. HE IS EXPECTED TO PROVIDE A SHOULDER FOR HIS WIFE TO CRY ON - BUT HE NEEDS TO LEARN TO CRY ALONE. HOWEVER, REMEMBER THAT THE URGE FOR FATHERHOOD CAN BE BIOLOGICALLY AS STRONG AS THE URGE FOR MOTHERHOOD - AND WE SHOULD STOP TREATING INFERTILE MEN AS SECOND CLASS CITIZENS.





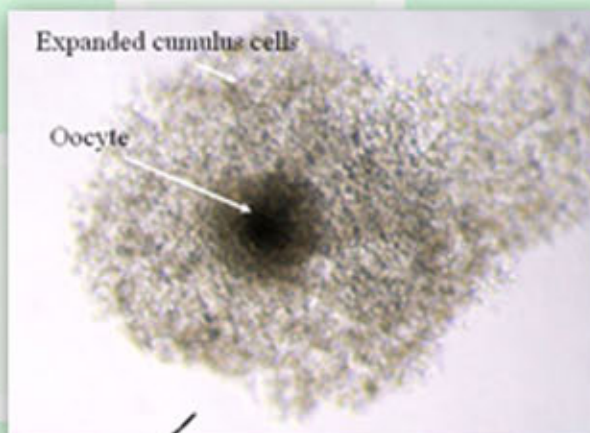
THE INTRODUCTION OF MICROINJECTION TECHNOLOGY INTO THE IN VITRO FERTILIZATION LABORATORY HAS REVOLUTIONIZED OUR TREATMENT OF THE INFERTILE MAN. INTRACYTOPLASMIC SPERM INJECTION, OR ICSI, USES MICROMANIPULATION TECHNOLOGY FOR TREATING MALE INFERTILITY. WHAT ICSI PROMISES IS THE POSSIBILITY FOR EVERY MAN TO FATHER HIS OWN BABY - NO MATTER WHAT HIS MEDICAL PROBLEM!

AS THE NAME SUGGESTS, ICSI IS A TECHNIQUE IN WHICH A SINGLE SPERM IS INJECTED INTO THE CENTRE OF THE CYTOPLASM OF THE EGG, IN ORDER TO ACHIEVE FERTILIZATION. THE BEAUTY OF THE TECHNIQUE IS THAT SINCE THE SPERM IS BEING INJECTED DIRECTLY INTO THE EGG, ALL THAT IS NEEDED TO ACHIEVE FERTILIZATION ARE LIVE SPERM - NO MATTER HOW ABNORMAL THESE MAY APPEAR TO BE. WITH ICSI THE EQUATION "1 EGG PLUS 1 SPERM = 1 EMBRYO" BECOMES POSSIBLE!



THE PROCEDURE FOR ICSI

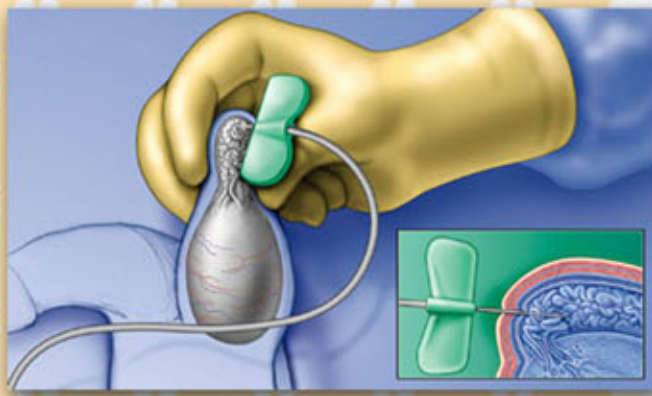
ICSI IS DONE IN A SUPEROVULATED CYCLE DURING WHICH FERTILITY DRUGS (HUMAN MENOPAUSAL GONADOTROPIN - HMG- INJECTIONS) ARE ADMINISTERED TO THE WIFE TO AID IN THE PRODUCTION OF MULTIPLE EGGS, WHICH ARE THEN REMOVED UNDER VAGINAL ULTRASOUND GUIDANCE AS IS DONE FOR IVF.



IN NORMAL CIRCUMSTANCES, THE EGG IS SURROUNDED BY A CLUSTER OF CELLS KNOWN AS THE CUMULUS CORONA CELLS. THIS IS CALLED THE OOCYTE CUMULUS CORONA COMPLEX. THESE CUMULUS CELLS ARE REMOVED BY REPEATED PASSAGE OF THE COMPLEX THROUGH FINE PIPETTES, AND BY TREATING THEM WITH A CHEMICAL CALLED HYALURONIDASE SO THAT THESE CELLS ARE STRIPPED OFF. THE DENUDED EGGS ARE EXAMINED, AND ONLY MATURE EGGS IN METAPHASE II ARE USED FOR ICSI.

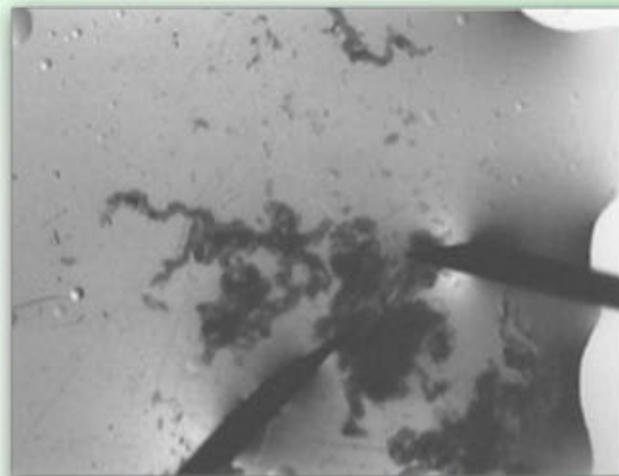


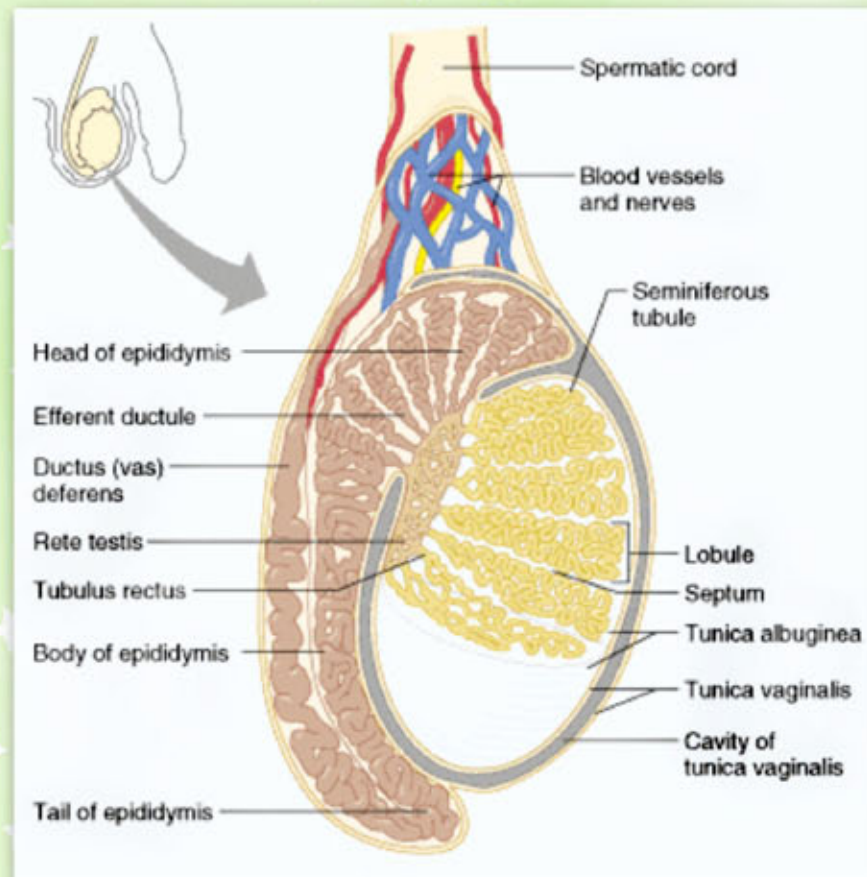
SPERM IS COLLECTED FROM THE MAN, USUALLY THROUGH MASTURBATION. FOR MEN WITH SEVERE OLIGOSPERMIA, WE HAVE FOUND IT USEFUL TO USE SEQUENTIAL EJACULATES. EVEN THOUGH THE FIRST SEMEN SAMPLE MAY NOT CONTAIN ANY SPERM, WE OFTEN FIND MOTILE SPERM IN THE SECOND (OR EVEN THE THIRD SAMPLE, FOR MEN WITH ENOUGH STAMINA !)



FOR MEN WITH VARIABLE SPERM COUNTS, WHICH VARY FROM ZERO TO A FEW THOUSAND, IT MAY BE HELPFUL TO FREEZE A SAMPLE IN ADVANCE. FOR PATIENTS WITH AZOOSPERMIA, SPERM HARVESTING TECHNIQUES NEED TO BE USED TO RETRIEVE THE SPERM. FOR MEN WITH OBSTRUCTIVE AZOOSPERMIA, THE SIMPLEST TECHNIQUE IS CALLED PESA IN WHICH THE SPERM IS SUCKED OUT FROM THE EPIDIDYMIS BY PUNCTURING IT WITH A FINE NEEDLE.

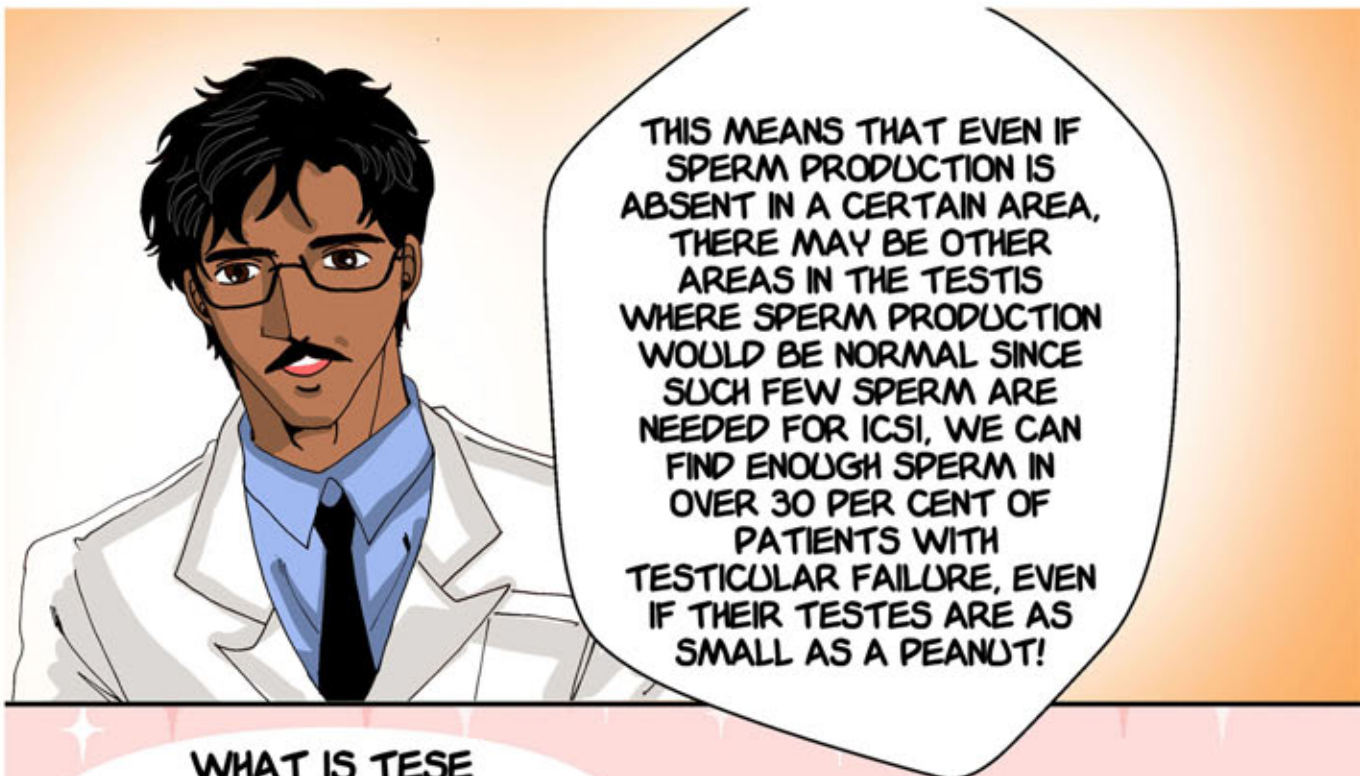
FOR PATIENTS WITH OBSTRUCTIVE AZOOSPERMIA IN WHOM SPERM CANNOT BE FOUND IN THE EPIDIDYMIS, IT IS ALWAYS POSSIBLE TO FIND SPERM IN THE TESTIS. THE EASIEST WAY TO RETRIEVE THIS IS THROUGH TESA OR TESTICULAR SPERM ASPIRATION, IN WHICH THE TESTICULAR TISSUE IS SUCKED OUT THROUGH A FINE NEEDLE, UNDER LOCAL ANAESTHESIA. THE TESTICULAR TISSUE IS PLACED IN CULTURE MEDIA AND SENT TO THE LAB, WHERE IT IS PROCESSED. THE SEMINIFEROUS TUBULES ARE DISSECTED, THUS LIBERATING THE SPERM WHICH ARE THEN USED FOR ICSI.





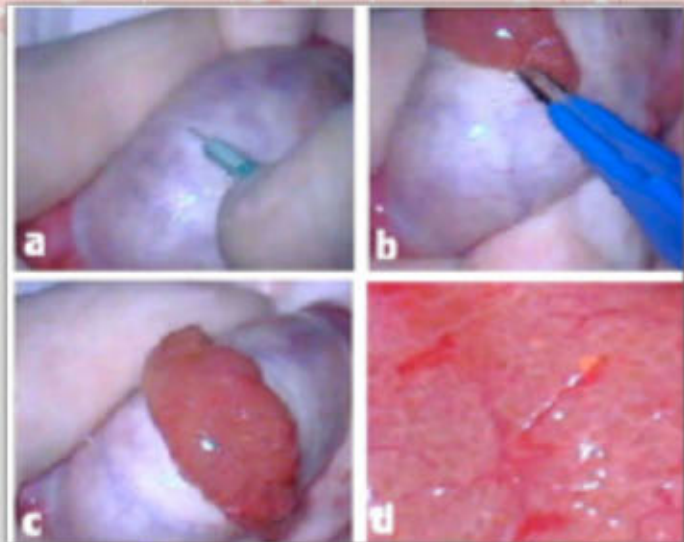
USING SPERM FROM THE EPIDIDYMIS AND TESTIS FOR ICSI IN ORDER TO TREAT PATIENTS WITH OBSTRUCTIVE AZOOSPERMIA IS LOGICAL, AND THUS CONCEPTUALLY EASY TO UNDERSTAND. HOWEVER, SURPRISINGLY, IT IS POSSIBLE TO FIND SPERM EVEN IN PATIENTS WHO HAVE TESTICULAR FAILURE (NONOBSTRUCTIVE AZOOSPERMIA) - EVEN IN MEN WITH VERY SMALL TESTES. THE REASON FOR THIS IS THAT DEFECTS IN SPERM PRODUCTION ARE "PATCHY"- THEY DO NOT AFFECT THE ENTIRE TESTIS UNIFORMLY.





**WHAT IS TESE
(TESTICULAR SPERM
EXTRACTION) ICSI ?**

WHILE FINDING SPERM IS QUITE EASY IN MEN WITH OBSTRUCTIVE AZOOSPERMIA(SINCE THEIR TESTES ARE FUNCTIONING NORMALLY), PATIENTS WITH NON OBSTRUCTIVE AZOOSPERMIA (TESTICULAR FAILURE) CAN BE VERY CHALLENGING. OFTEN, SPERM PRODUCTION IN THESE MEN IS SPARSE, AND MULTIPLE SITES IN THE TESTIS MAY NEED TO BE SAMPLED BEFORE BEING ABLE TO FIND SPERM. THIS CAN BE DONE BY PERFORMING MULTIPLE TINY MICROBIOPSIES , AND THIS IS CALLED TESE OR TESTICULAR SPERM EXTRACTION.





FINDING SPERM IN THE TESTICULAR TISSUE CAN BE A LABORIOUS PROCESS, DEPENDING ON THE DEGREE OF SPERM PRODUCTION, AND FOR SOME MEN WITH PARTIAL TESTICULAR FAILURE, IT CAN TAKE UPTO 2-3 HOURS TO FIND THE SPERM. ALSO, TESTICULAR SPERM ARE TECHNICALLY HARD TO WORK WITH IN THE LABORATORY AND ONLY SOME IVF CLINICS HAVE THE REQUISITE EXPERTISE. FOR MEN WITH NON OBSTRUCTIVE AZOOSPERMIA, SOME CLINICS PERFORM THE TESE THE DAY PRIOR TO EGG RETRIEVAL. THEY CULTURE THE TESTICULAR TISSUE IN THE INCUBATOR FOR 24 HOURS AND THIS CAN HELP THE SPERM TO ACQUIRE MOTILITY.

IN CASE NO SPERM ARE FOUND, EITHER THE COUPLE DECIDES TO CANCEL THE EGG RETRIEVAL AND ABANDON THE CYCLE, OR TO GO AHEAD WITH USING DONOR SPERM FOR IVF, AS A BACKUP OPTION.





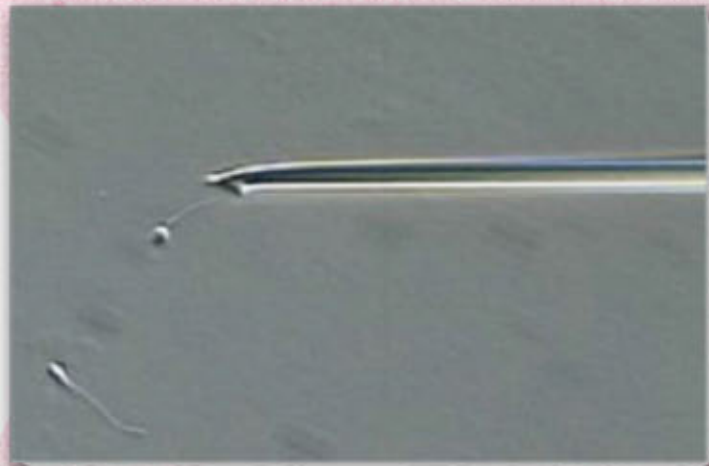
IN PATIENTS IN WHOM SURGERY NEEDS TO BE PERFORMED IN ORDER TO RECOVER TESTICULAR OR EPIDIDYMAL SPERM, IT IS NOW POSSIBLE TO FREEZE THE EXCESS SPERM. THESE SPERM CAN THEN BE THAWED AND USED IN FUTURE CYCLES IN NEEDED, THUS SPARING THE PATIENT THE NEED FOR REPEATED SURGERY FOR SPERM RETRIEVAL



HOW IS A SINGLE SPERM INJECTED INTO THE EGG FOR ICSI IN THE IVF LABORATORY ?

THE INJECTION IS PERFORMED ON A HEATING STAGE, ON A SPECIALIZED INVERTED MICROSCOPE EQUIPPED WITH HOFFMAN MODULATION CONTRAST OPTICS THE PRECISE CONTROL THAT IS NEEDED FOR MICROINJECTION IS PROVIDED BY USING SPECIALIZED MICROMANIPULATORS, WHICH ALLOW THE EMBRYOLOGIST TO EXECUTE VERY FINE MOVEMENTS.

THE EGG IS SECURED IN PLACE BY APPLYING GENTLE SUCTION TO ITS SHELL (THE ZONA) WITH A HOLDING PIPETTE. THE SPERM IS THEN INJECTED DIRECTLY INTO THE CENTRE (CYTOPLASM) OF THE EGG. THE SKILL OF THE EMBRYOLOGIST IS A CRITICAL FACTOR IN THE SUCCESS OF THE ICSI PROCESS. AFTER INJECTING THE SPERM, THE PIPETTE IS WITHDRAWN.



REMARKABLY, ONCE THE INJECTING PIPETTE IS WITHDRAWN, THE EGG ASSUMES ITS ORIGINAL SHAPE WITHIN 60 SECONDS. IN ICSI, THE SPERM IS GIVEN A "PIGGYBACK" RIDE INTO THE EGG, SO THAT WHAT THE SPERM CANNOT ACCOMPLISH ON ITS OWN, THE LABORATORY DOES FOR IT! THE ONLY REQUIREMENT FOR ICSI IS THAT THE SPERM SHOULD BE ALIVE, AND THERE SHOULD BE AS MANY SPERM AS THERE ARE EGGS.

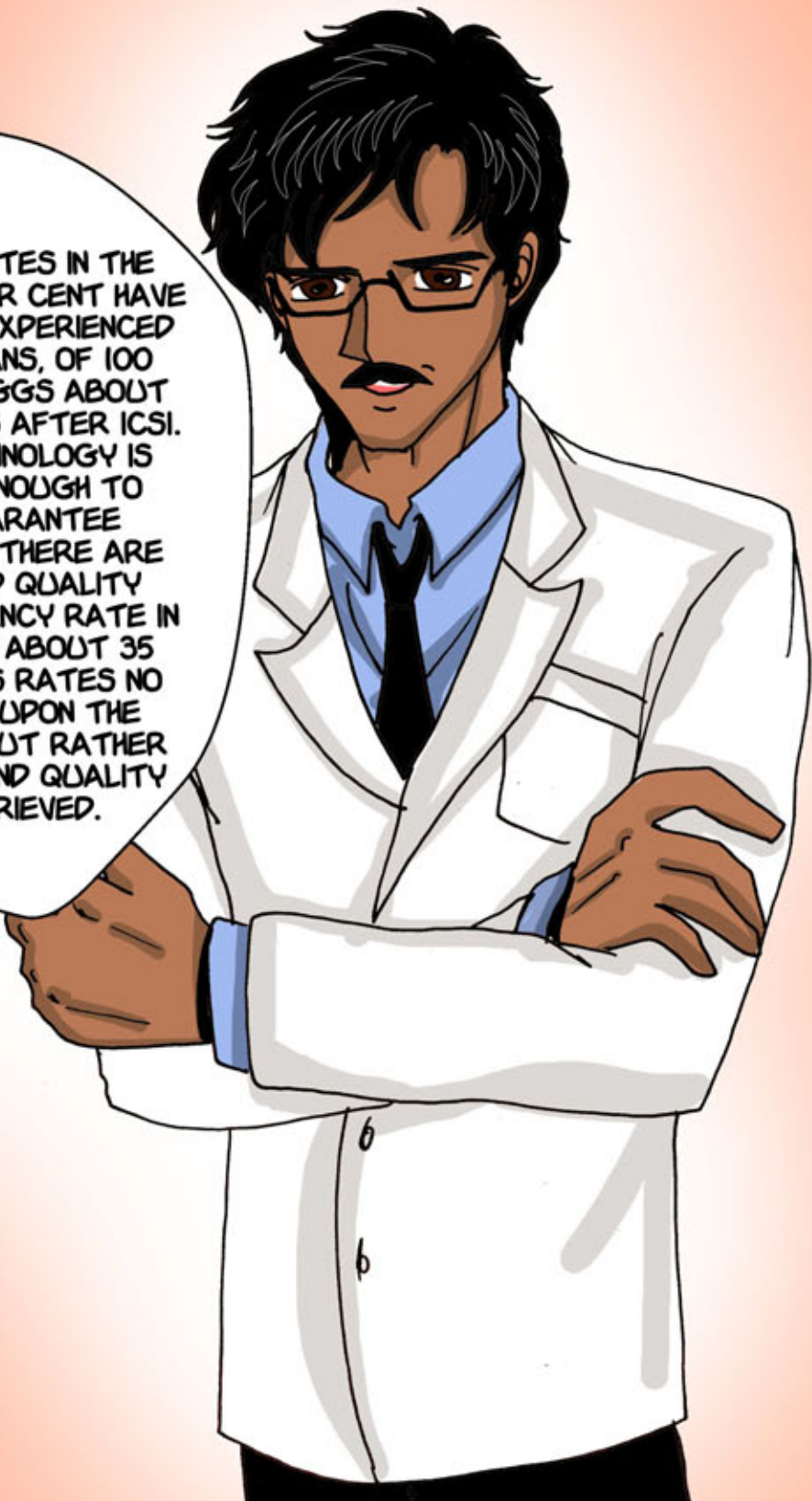




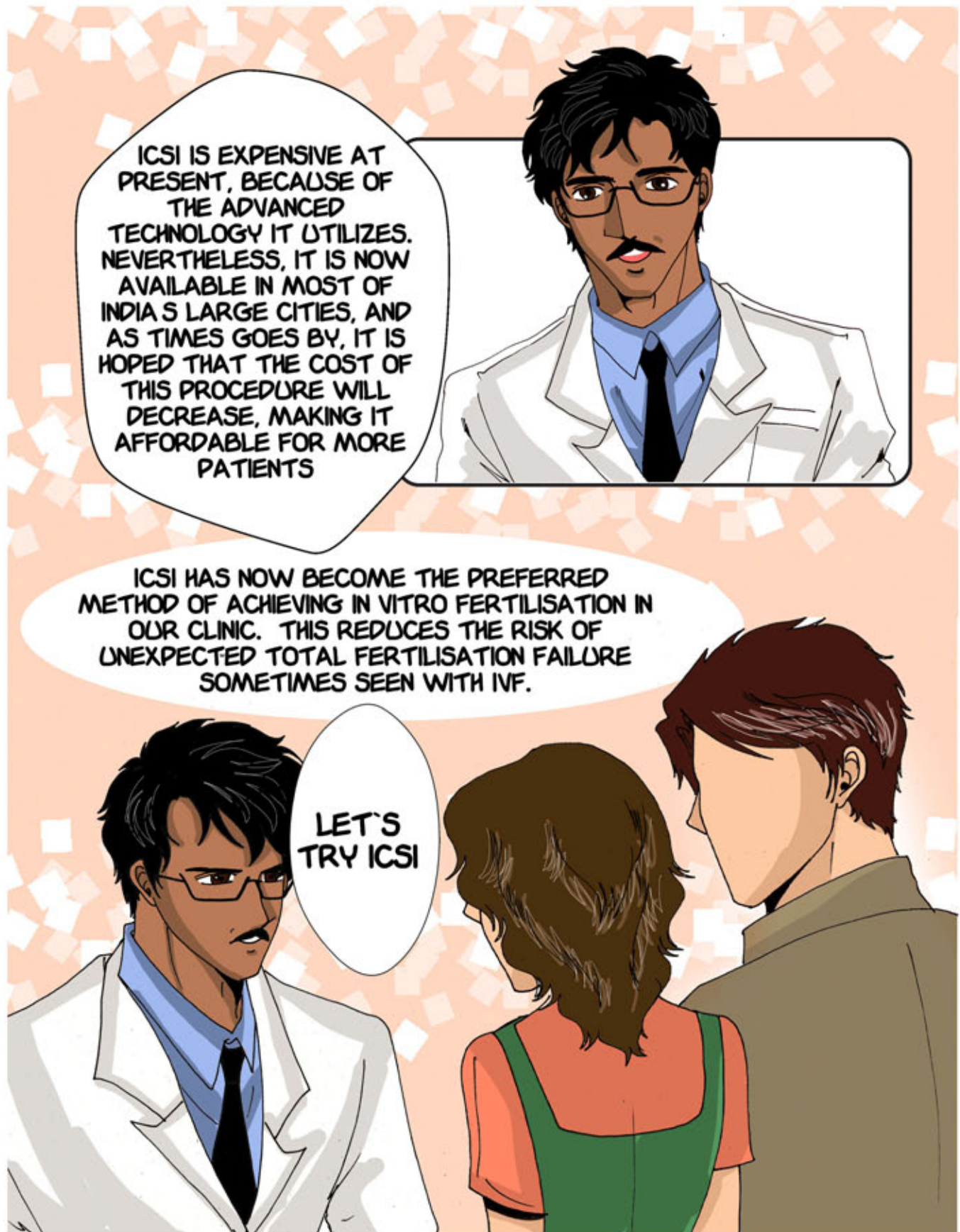
ONCE ALL THE EGGS ARE INJECTED WITH A SINGLE SPERM EACH, THEY ARE PLACED IN THE CO₂ INCUBATOR, AND THEN OBSERVED APPROXIMATELY 14 HOURS LATER TO SEE IF FERTILIZATION HAS TAKEN PLACE. IF FERTILIZATION HAS OCCURRED, THE 2-4 CELL EMBRYOS CAN BE TRANSFERRED INTO THE WIFE'S UTERUS ABOUT 48-72 HOURS AFTER ICSI, AS IS DONE FOR IVF. INTERESTINGLY, EMBRYO IMPLANTATION RATES IN THESE PATIENTS ARE QUITE HIGH, BECAUSE THE WIVES ARE USUALLY YOUNG AND COMPLETELY NORMAL.

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FERTILIZATION RATES IN THE RANGE OF 60-80 PER CENT HAVE BEEN ACHIEVED IN EXPERIENCED HANDS-WHICH MEANS, OF 100 MICROINJECTION EGGS ABOUT 60 FORM EMBRYOS AFTER ICSI. IN FACT THE TECHNOLOGY IS NOW RELIABLE ENOUGH TO VIRTUALLY GUARANTEE FERTILIZATION, IF THERE ARE SUFFICIENT GOOD QUALITY EGGS. THE PREGNANCY RATE IN ONE ICSI CYCLE IS ABOUT 35 PERCENT. SUCCESS RATES NO LONGER DEPEND UPON THE SPERM QUALITY BUT RATHER ON THE NUMBER AND QUALITY OF EGGS RETRIEVED.





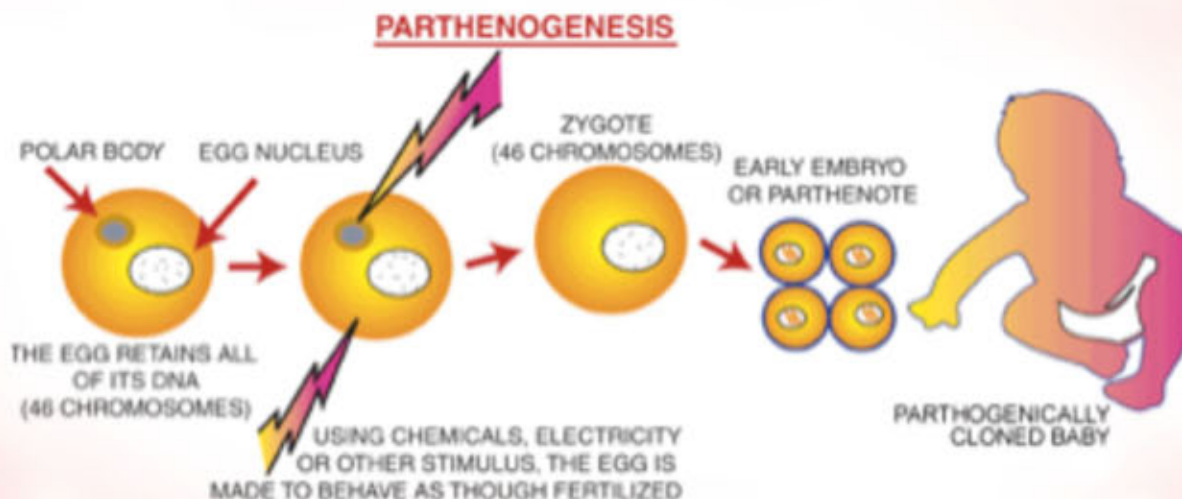
MORE THAN 100,000 BABIES HAVE BEEN BORN WORLDWIDE AFTER ICSI, AND DETAILED STUDIES HAVE SHOWN THAT THERE IS NO INCREASED RISK OF BIRTH DEFECTS OR GENETIC ANOMALIES, AS A RESULT OF THE TECHNIQUE

HOWEVER, SOME OF THE MALE CHILDREN BORN AS A RESULT OF THIS TECHNIQUE MAY BE INFERTILE AS WELL (FOR EXAMPLE, IF THE CAUSE FOR THE TESTICULAR FAILURE IS A DEFECTIVE GENETIC LOCUS, SUCH AS A MICRODELETION ON THE Y CHROMOSOME).





RECENT ADVANCES FOR SOME PATIENTS WITH SEVERE TESTICULAR FAILURE, SOMETIMES, IT IS NOT POSSIBLE TO FIND ANY SPERM AT ALL AS EVEN IN SPITE OF TAKING MULTIPLE TESTICULAR BIOPSIES. IN SUCH PATIENTS PREGNANCIES HAVE BEEN ACHIEVED BY INJECTING ROUND SPERMATIDS (IMMATURE SPERM PRECURSOR CELLS) FROM THE TESTIS INTO THE EGG. THIS IS NOW AN AREA OF INTENSE RESEARCH ALL OVER THE WORLD, BUT THE RESULTS HAVE BEEN DISAPPOINTING SO FAR. OTHER LABS ARE TRYING TO DEVELOP METHODS OF IN VITRO SPERMATOGENESIS, IN ORDER TO MATURE THE SPERMATIDS IN VITRO.



FOR MEN WITH NO TESTIS AT ALL, THE ONLY TECHNOLOGIC SOLUTION TODAY WOULD BE CLONING USING NUCLEAR TRANSFER TECHNOLOGY. THIS INVOLVES INSERTING THE NUCLEUS FROM AN ORDINARY CELL OF THE MAN (WHICH CONTAINS ALL HIS DNA) INTO HIS WIFE S UNFERTILISED EGG (THE NUCLEUS OF WHICH HAS BEEN REMOVED) AND THEN ACTIVATING IT BY ELECTROFUSION. WHILE CLONING HAS BEEN PERFORMED SUCCESSFULLY IN MANY ANIMAL SPECIES, IT HAS NEVER BEEN USED FOR TREATING HUMANS SO FAR.

