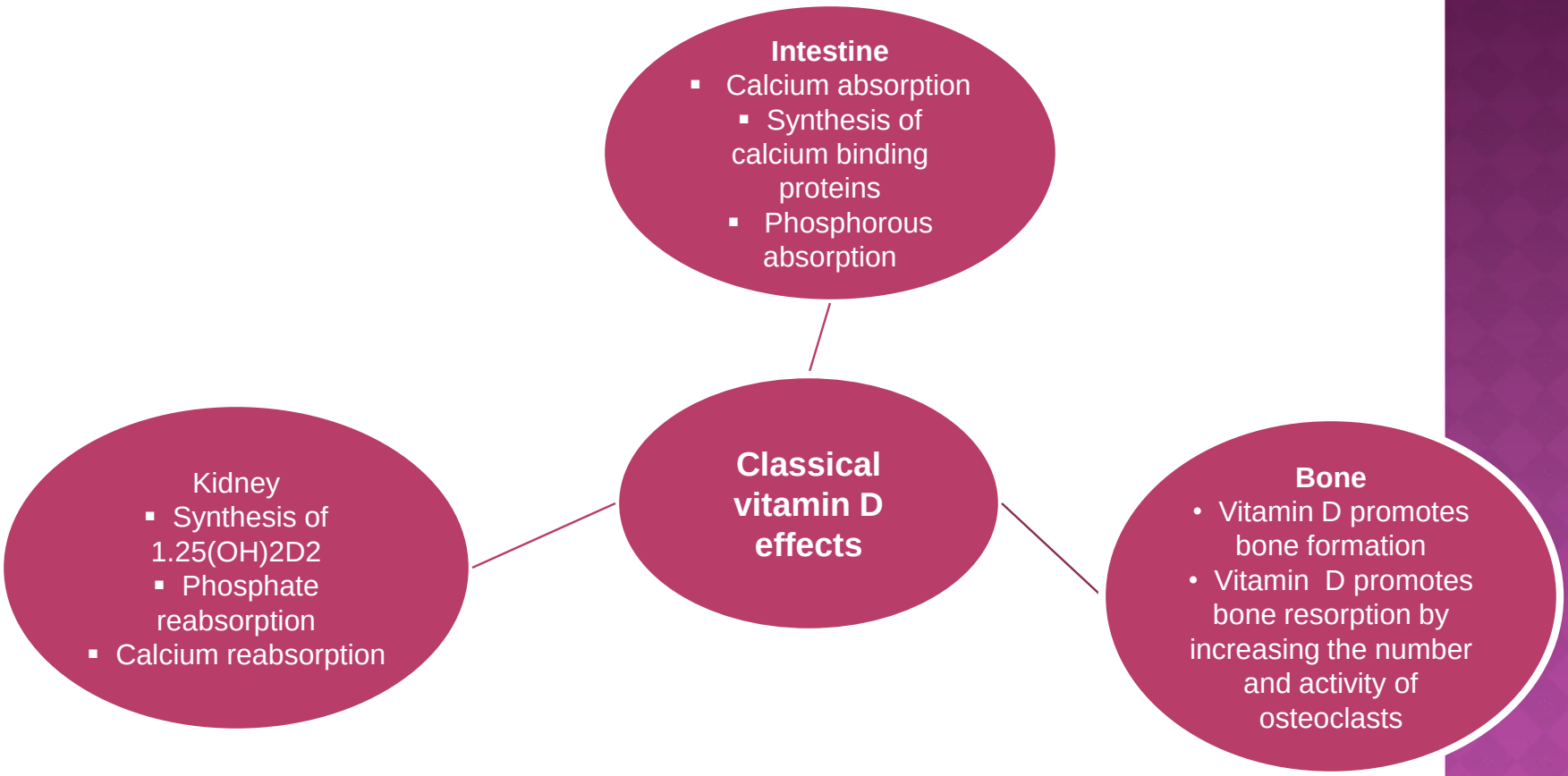
VITAMIN D, ANTIOXIDANTS, NUTRITION, NEW LOOK IN INFERTILITY

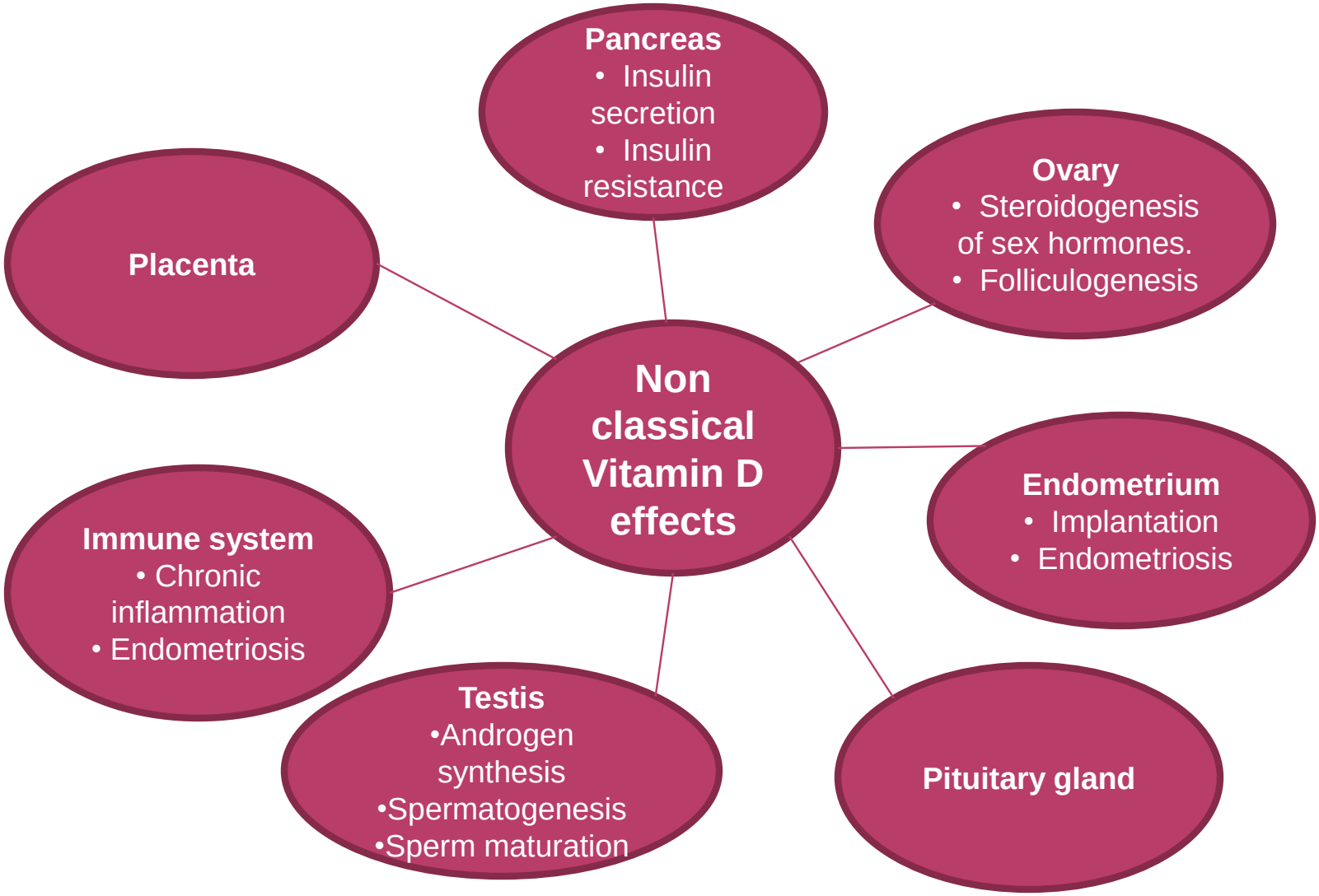
DR.AWATIF ALBAHAR (DHA)

Vit D is well known in promoting bone mineralization also decreased Vitamin D level is associated or linked with an increase risk for Cancer, autoimmune disease, diabetics, & cardiovascular disease. In our field sufficient Vit D is also modulates reproductive process in women & men.

a)CLASSICAL VITAMIN D EFFECTS



b) NON CLASSICAL VITAMIN D EFFECTS



Lerchbaum E, and Obermayer – Pietsch B Eur J Endocrinol 2012;166:765-778

- Recently VDR was detected in human sperms. It was located largely in sperm nucleus as well as reported that VDR & Vit D metabolizing enzymes are expressed in spermatids, vesicles within the caput epididymis and glandular epithelium of cauda epididymis, seminal vesicle, and prostate.

Vit D has a biologically plausible role in female reproduction. In human ovarian tissue, 1.25 (OH)2D3 stimulated progesterone production by 13% Estradiol production by 9% & estrone production by 21%.

In women VDR(Vitamin D Receptor) mRNA has been shown to be expressed in the ovaries in mixed ovarian cells, & in purified granulosa cell cultures, this shows the role of Vit D in steroid oogenesis of sex hormones.

IN MEN

- **SEMEN &TESTICULOPATHY**

Calcium is important in the male reproductive tract, where it is essential for spermatogenesis, sperm, motility, hyper activation & acrosome reaction. The role of Vitamin D which is known as an important regulator of calcium metabolism , in semen quality & spermatogenesis is less clear.

- **TESTOSTERONE**

It was demonstrated that the regulation of fine expression by Vitamin D metabolites is modified according to androgen levels. Suggests that androgen deficiency could hypothetically amplify the adverse health consequences of Vitamin D deficiency

Studies of the role of Vitamin D in Females eg: IVF revealed inconsistent results.

IN FEMALES

- **PREGNANCY**

Maternal Vitamin D deficiency might be independently associated with an elevated risk for gestational DM Vitamin D deficiency among pregnant women has been associated with elevated risk for other pregnancy complications such as pre eclampsia & bacterial vaginosis. (Study Review)

ENDOMETRIOSIS

It has been shown that the VDR & lα hydroxylase are expressed in the endometrium suggesting that endometrium is an extra renal site of Vitamin D synthesis & Vitamin D action

i) Given that Vitamin D is an effective regulator of immune system & endometriosis has been shown to be associated with significant immune derangements, one might speculate about an influence of Vitamin D in the local immune suppression & development of endometriosis.

ii) Vitamin D is involved in the regulation of the immune system.

PCO

There is some evidence suggests that Vitamin D deficiency might be involved in the pathogenesis of insulin resistance & the metabolic syndrome in PCOS. However several studies correlating low 25(OH)D status with features of PCOS. There is evidence that low Vitamin D levels are associated with obesity VDR regulates more than 3% of the human genome, including genes that are crucial for glucose.

VIT D SUPPLEMENTATION

- To date there are no specific guidelines regarding Vitamin D supplementation for women or men affected by endocrine disturbances including infertility or hypogonadism.
- The 2011 report from the IOM recommends a 25(OH)D level of at least 50 nmol/l (20mg/ml) based on positive vitamin D effects on bone health.

ANTIOXIDANTS

Antioxidants are a family of vitamins, minerals and other nutrients that help to protect the body from the damage caused by free radicals.

Free radicals are unstable molecules that can damage cell structures. Free radicals are produce from the activities in our bodies (during energy production) also chemicals In our surrounding environment can also create free radicals. Antioxidants neutralize the free radicals ,stopping further damage from happening and protecting the cells health



Antioxidants are important and necessary for healthy fertility. Ovum and sperm made of cells as well which can be affected by free radical damage, so are the reproductive organs and glands that produce reproductive hormones.

In addition when DNA is attacked by free radicals, this damage DNA cause miscarriages or birth defects/ developmental problems for the future child.

ANTIOXIDANTS

- **GLUTATHIONE**

A) It is a master antioxidant and detoxifier. Glutathione involved also in the regulating the pathway that activate genes that can cause chronic inflammation that is suppress the genes responsible for triggering autoimmune tissue that is why it's a treatment given for miscarriages

B) It is not only vital to sperm antioxidant defenses but also is essential to the formation of phospholipid hydro peroxide glutathione peroxidase- an enzyme present in spermatids which becomes a structural protein in the mid- piece of mature spermatozoa.



COENZYMES (CoQ10)

- It has been known that CoQ10 biosynthesis is markedly active in testis and high levels of its reduced form QH2 (ubiquinol) are present in semen which suggests a protective role as scavenger in this biological system.

It has been demonstrated that reduced levels of CoQ10 in the seminal plasma and sperm cells of infertile men with idiopathic and varicocele were associated with asthenosperma.



VITAMIN C

- Vitamin C is another very important antioxidants for both male and female fertility. Vitamin C improves hormone levels and increases to a new study published in fertility and sterility (2003;80:459-61)

  in another study proved that taking Vitamin C can enhance the action of clomed to reach ovulation.

In Men

Vitamin C improves sperm quality and protect sperm from DNA damage helping to reduce the chance of miscarriage and chromosomal problems. Vitamin C also appears to keep sperm from clumping together, mating them more motile.



LIPOIC ACID

- It is the only antioxidant that can regenerate glutathione and then it helps to build a strong and properly functioning immune system and can help to reverse some of the damage caused from smoking cigarettes.

It helps to protect female reproductive organs and improve sperm quality and motility.



EFFECTS OF ANTIOXIDANTS

Effects of Antioxidants on Sperm Quality

NUTRIENT	DAILY DOSE	IMPROVEMENTS IN SPERM QUALITY	IMPROVEMENT IN PREGNAANCY RATE
Vitamin C 74-77	1000 mg	Count, motility, structure	100% (in combination with Vitamin E)
Vitamin E 12,78.80	300mg to 1000mg	Enhances sperm binding to egg, reduced sperm DNA damage	21%
Coenzyme Q10 (CoQ1081-87)	60 mg	Count, motility	16%
Selenium11,88-92	200to 225 mcg	Motility (all measures of sperm quality in combination with NAC)91	10.8%(in combination with vitamin E)88
N- acetylcysteine	600mg	Motility,structue,count,and volume	Not yet studied
Zinc 93-98	66mg	Count	Not yet studied

ANTIOXIDANTS WORK BEST AS A NETWORK

- Lipoic acid can be regenerated by itself and can regenerate all of the other antioxidants
- Vitamin C is regenerated by Vitamin E, glutathione and Lipoic acid
- Vitamin E is regenerated by Vitamin C, co Q10 and Lipoic acid
- Glutathione is regenerated by Lipoic acid

VITAMINS CAN INCREASE FERTILITY

- Prenatal Vitamins
- Folic Acid
- Vitamin C
- Zinc
- Evening Primrose oil
- Vitamin B6 & Vitamin B12

NUTRITION

NUTRITIONAL ADVICE TO BOOST FERTILITY

- Reduce intake of foods with trans & saturated fats while increasing intake of monounsaturated fats, such as avocados and olive oil
- Lower intake of animal protein and increase the vegetables.
- Consume high fat dairy instead of low fat dairy (Harward University study)
- To eat more fibre in the diet by adding whole grains, vegetables, fruits.

- Add more vegetarian source of iron such as Legumes,Tofu,Nuts,Seeds and Whole grains.
- Folic acid in a dose of 800mg, 3months preconception Royal jelly, Primriese oil .

IN MEN

- For men also important to maintain healthy body weight as male obesity may affect fertility by altering testosterone and other hormone levels.
- No cigarette, no alcohol

TAKE HOME MESSAGE

- Vitamin D supplementation is a safe & cheap treatment, which might have some beneficial effects on human reproduction

Antioxidant & cell energizing nutrients can improve sperm motility, sperm count & the number of normal sperm cells while reducing damage to sperm DNA ultimately improving the chances of successful pregnancy.

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