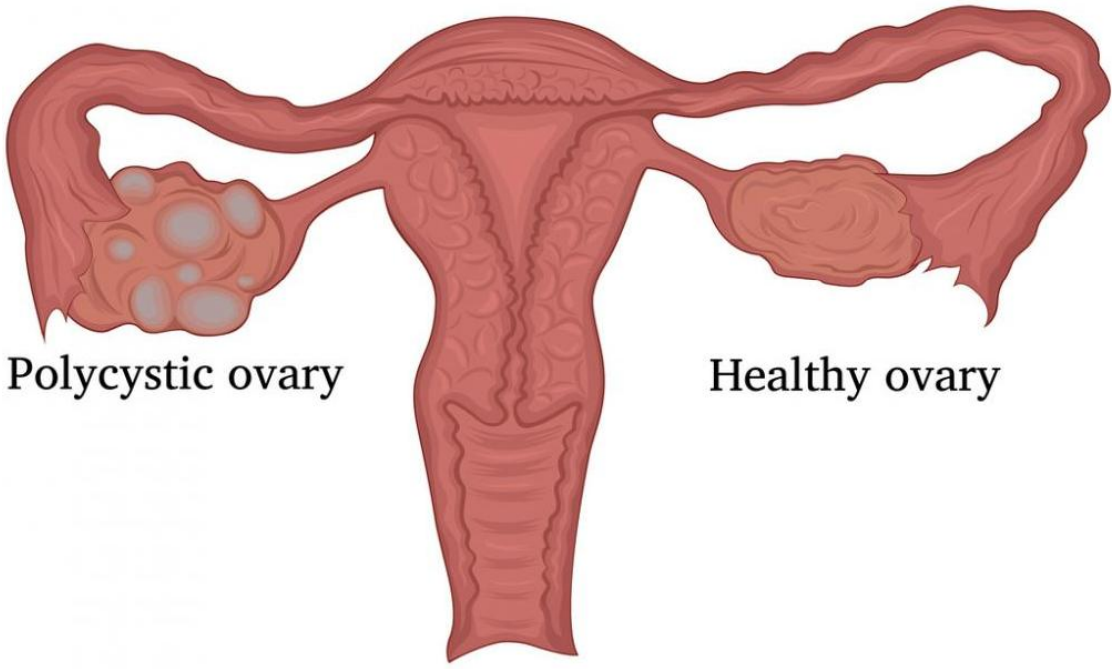
Medimail
February 2019

Polycystic Ovarian Syndrome

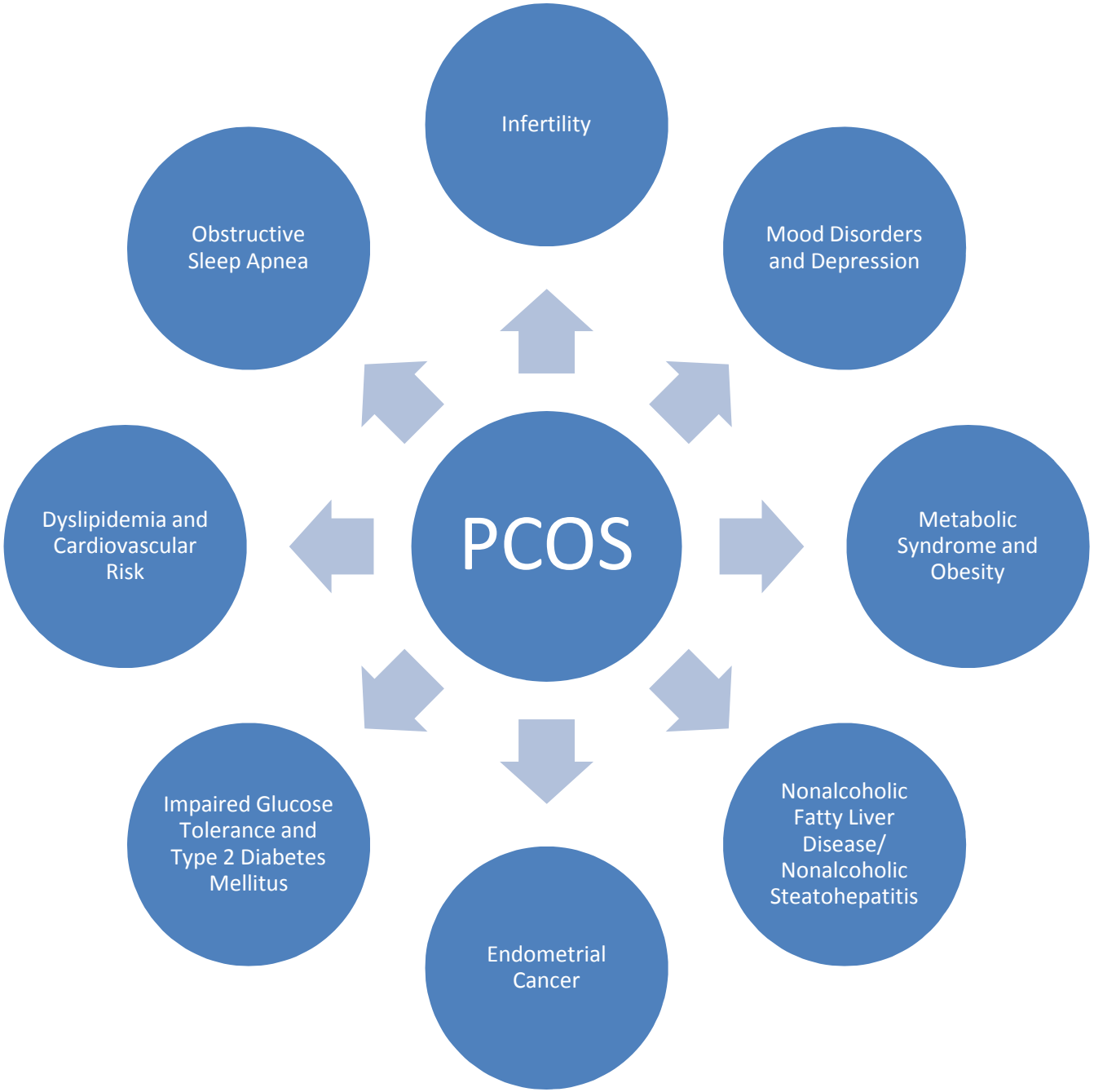
Diagnostic Recommendations



Polycystic Ovarian Syndrome (PCOS)

- Most common metabolic and endocrine pathology in the reproductive age female around the world
- Stein and Leventhal initially described it in 1935
- Characterized by –
  - Oligo-ovulation/anovulation
  - Hyperandrogenism
  - Polycystic ovaries
- Signs and symptoms of PCOS include hirsutism, acne, menstrual irregularities, infertility, obesity, and psychiatric disorders such as anxiety and depression.

Conditions Associated with PCOS



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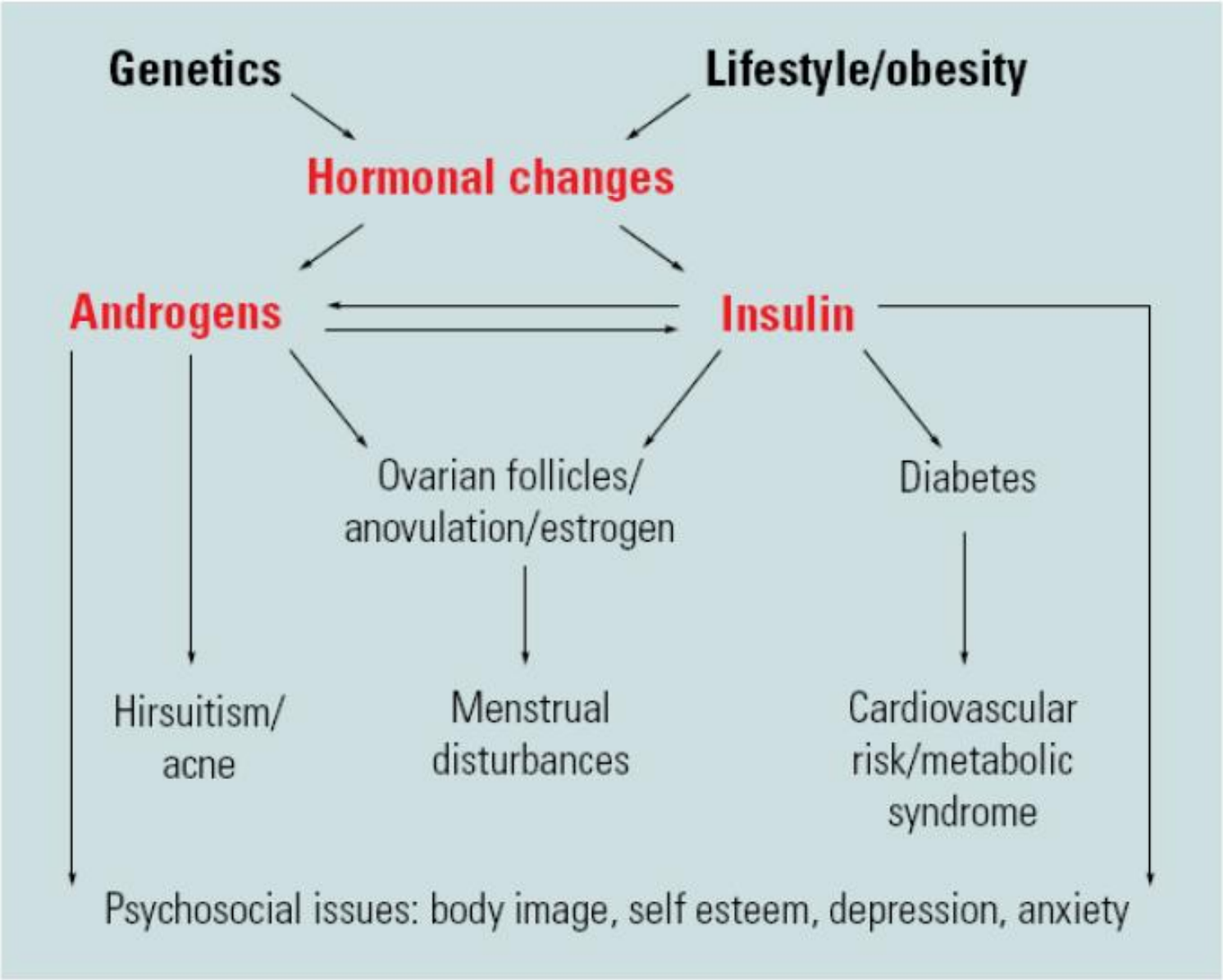
Schema of Etiology & Clinical Features Including Reproductive, Metabolic and Psychosocial Features of PCOS



Teede et al. BMC Medicine 2010, 8:41

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Prevalence

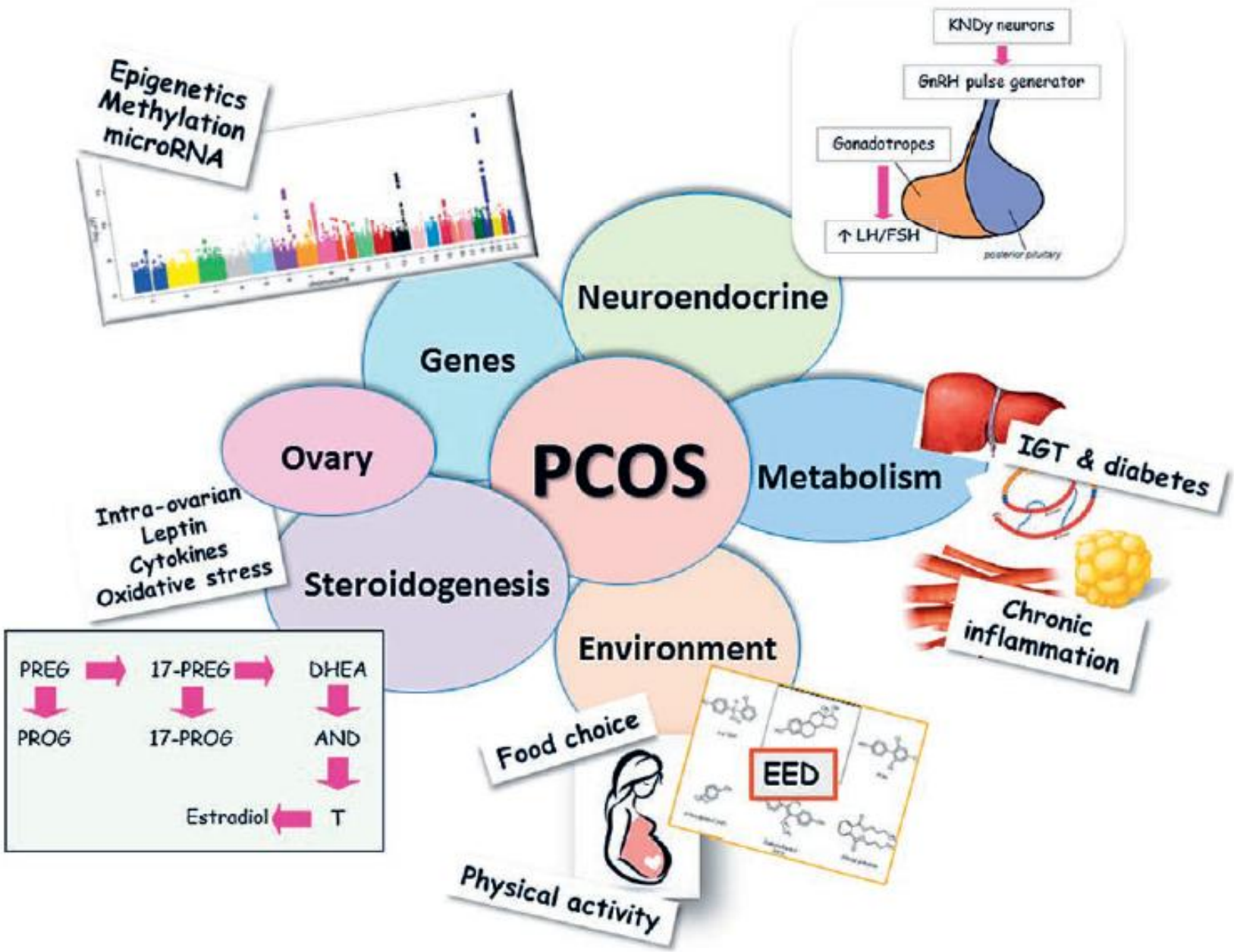
- Prevalence ranges around 5% to 15% depending on the diagnostic criteria applied in the world.
- The prevalence of PCOS increases rapidly from 12 to 14 years of age, peaks between 15 and 24, and decreases gradually thereafter, reaching its lowest point before menopause (Zhuang et al., 2014).

Prevalence in India

Source	Population	NIH/NICHD	Rotterdam	Androgen excess and PCOS society
Beena Joshi,et al	600 Indian (Mumbai)	-	22.5 %	10%
Nidhi R et al	460 Indian (Andhra Pradesh)	-	9.3%	-
Chhabra S et al	1182 Indian Rural (Sevagram)	-	8.4%	-
Balaji S etal	163 Indian(Vellore) Urban 63,Rural 63 Age 12-19yrs	-	18% (U 25%, R 11%)	-

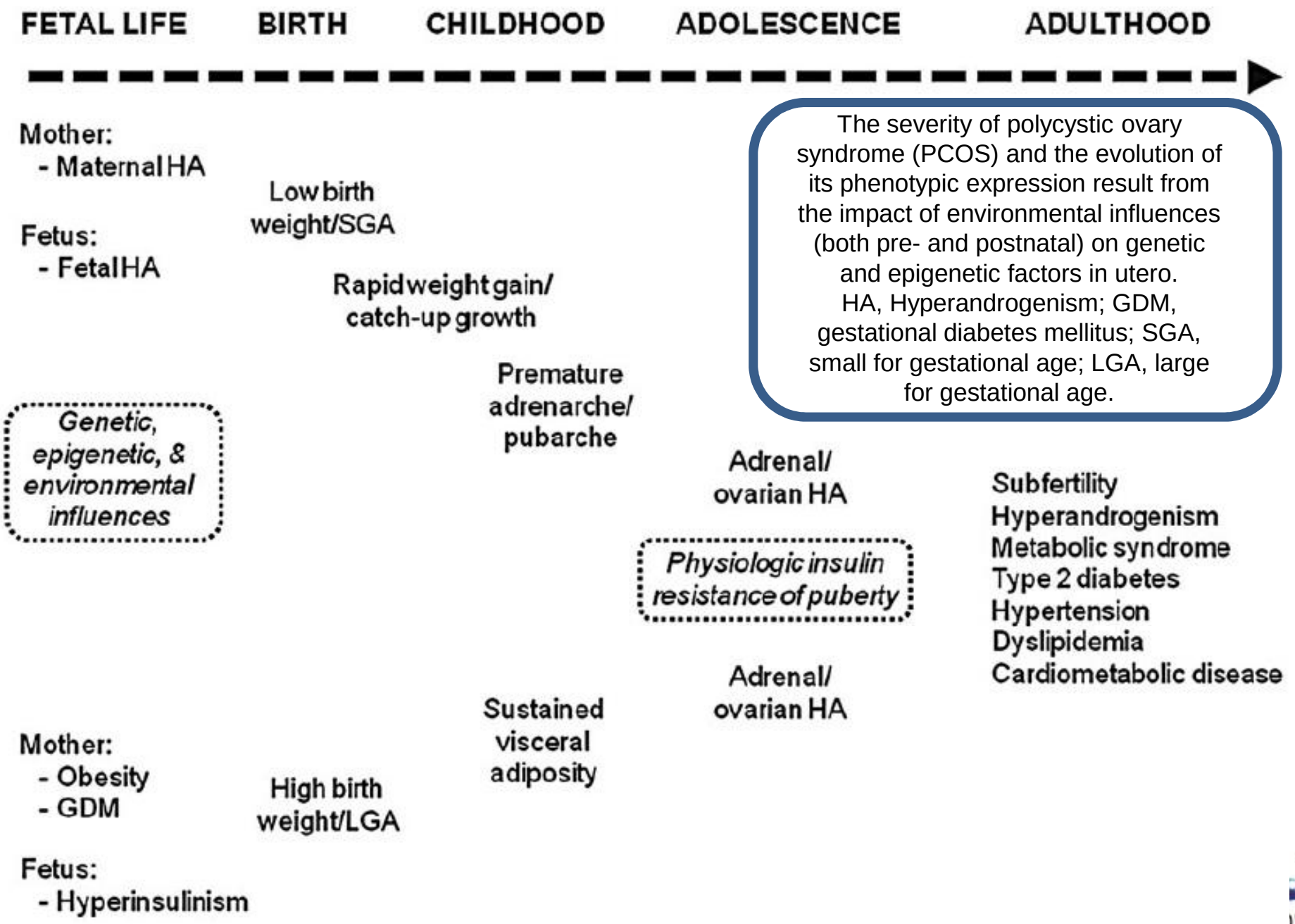
Wang et al. / J Zhejiang Univ-Sci B (Biomed & Biotechnol) 2018 19(5):354-363;
http://www.pcosindia.org/files/education/pcos_epidemic_in_india_19_6_2016.pdf

Factors Involved in Pathophysiology of PCOS



Ibáñez L. Horm Res Paediatr. 2017;88(6):371-395

Proposed Natural History of PCOS From Fetal Life to Adulthood



Bremer AA. Metab Syndr Relat Disord. 2010 Oct; 8(5): 375–394

Criteria for Diagnosis of PCOS

Clinical finding	*National Institutes of Health criteria, 1990 (must have both of the findings marked below)*	*Rotterdam criteria, 2003 (must have any two of the findings marked below)*	*Androgen Excess and PCOS Society, 2009 (must have A plus either B or C)*
Hyperandrogenism*	X	X	A
Oligomenorrhea	X	X	B
Polycystic ovaries		X	C

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Diagnosis of PCOS in Adults

2003 Rotterdam ESHRE/ASRM)	***2013 the Endocrine Society***
At least 2 out of 3 criteria: *(1) oligo- or anovulation* *(2) clinical and/or biochemical signs of hyperandrogenism* *(3) PCO* ***Exclusion:*** *congenital adrenal hyperplasia, androgen-secreting tumors, or Cushing's syndrome.*	*At least 2 out of 3 criteria:* *(1) androgen excess* *(2) ovulatory dysfunction* *(3) PCO* ***Exclusion:*** *thyroid disease, hyperprolactinemia, or nonclassic congenital adrenal hyperplasia.*

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Diagnosis of PCOS in Adolescents

2003 Rotterdam ESHRE/ASRM)	***2013 the Endocrine Society***
(1) Oligomenorrhea or amenorrhea present for at least 2 years after menarche (or primary amenorrhea at age 16 years); *(2) The diagnosis of PCO on ultrasound includes increased ovarian size (>10 cm3);* *(3) Hyperandrogenemia rather than just signs of androgen excess should be documented.*	*Clinical and/or biochemical evidence of hyperandrogenism (after exclusion of other pathologies), and persistent oligomenorrhea.*

Diagnosis of PCOS in Paediatric Population

NIH 1990

Requires the simultaneous presence of:
1. Hyperandrogenism (clinical and/or biochemical)
2. Ovarian dysfunction

2003 Rotterdam ESHRE/ASRM)

Requires the presence of at least two criteria:
1. Hyperandrogenism (clinical and/or biochemical)
2. Ovulatory dysfunction
3. Polycystic ovarian morphology

2006 AES

Requires the presence of hyperandrogenism (clinical and/or biochemical) and either:
1. Ovulatory dysfunction
2. Polycystic ovarian morphology

2009 Androgen Excess and PCOS Society

Requires the simultaneous presence of:
1. Hyperandrogenism (clinical and/or biochemical)
2. Ovarian dysfunction (ovulatory dysfunction and/or polycystic ovarian morphology)

Diagnosis of PCOS in Perimenopause and Menopause

2013 the Endocrine Society

Well-documented long-term history of oligomenorrhea and hyperandrogenism during the reproductive years. PCO on ultrasound is supportive.

Biochemical Hyperandrogenism – ASRM 2018

- Assessment of biochemical hyperandrogenism is most useful in establishing the diagnosis of PCOS and/or phenotype where clinical signs of hyperandrogenism (in particular hirsutism) are unclear or absent.

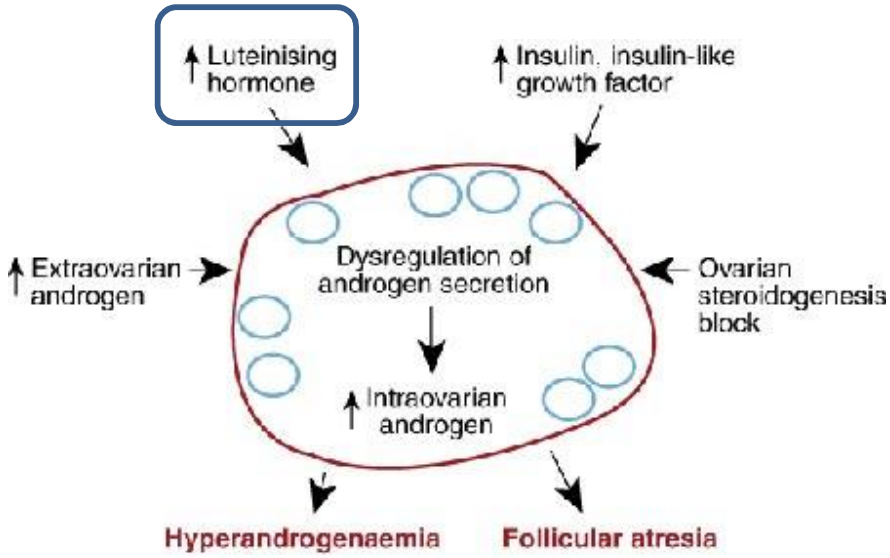
- Calculated free testosterone, free androgen index, or calculated bioavailable testosterone should be used to assess biochemical hyperandrogenism in the diagnosis of PCOS.

- Androstenedione and dehydroepiandrosterone sulfate (DHEAS) could be considered if total or free testosterone are not elevated; however, these provide limited additional information in the diagnosis of PCOS.

Teede HJ. Fertility and Sterility® Vol. 110, No. 3, August 2018 0015-0282

Reverse Ratio of FSH to LH

- A hallmark laboratory sign of PCOS is a reverse ratio of FSH to LH.
- Normally, an equal ratio of FSH to LH or, FSH being slightly higher than LH is observed.
- In PCOS, the ratio is reversed with a 3:1 of LH:FSH.



Elevated levels of LH (3x greater than FSH) stimulating increased androgen(testosterone) production by the ovary causing excess hair growth and acne.

https://www.acfs2000.com/polycystic-ovarian-disease-pcod.html

Anti-mullerian Hormone (AMH)

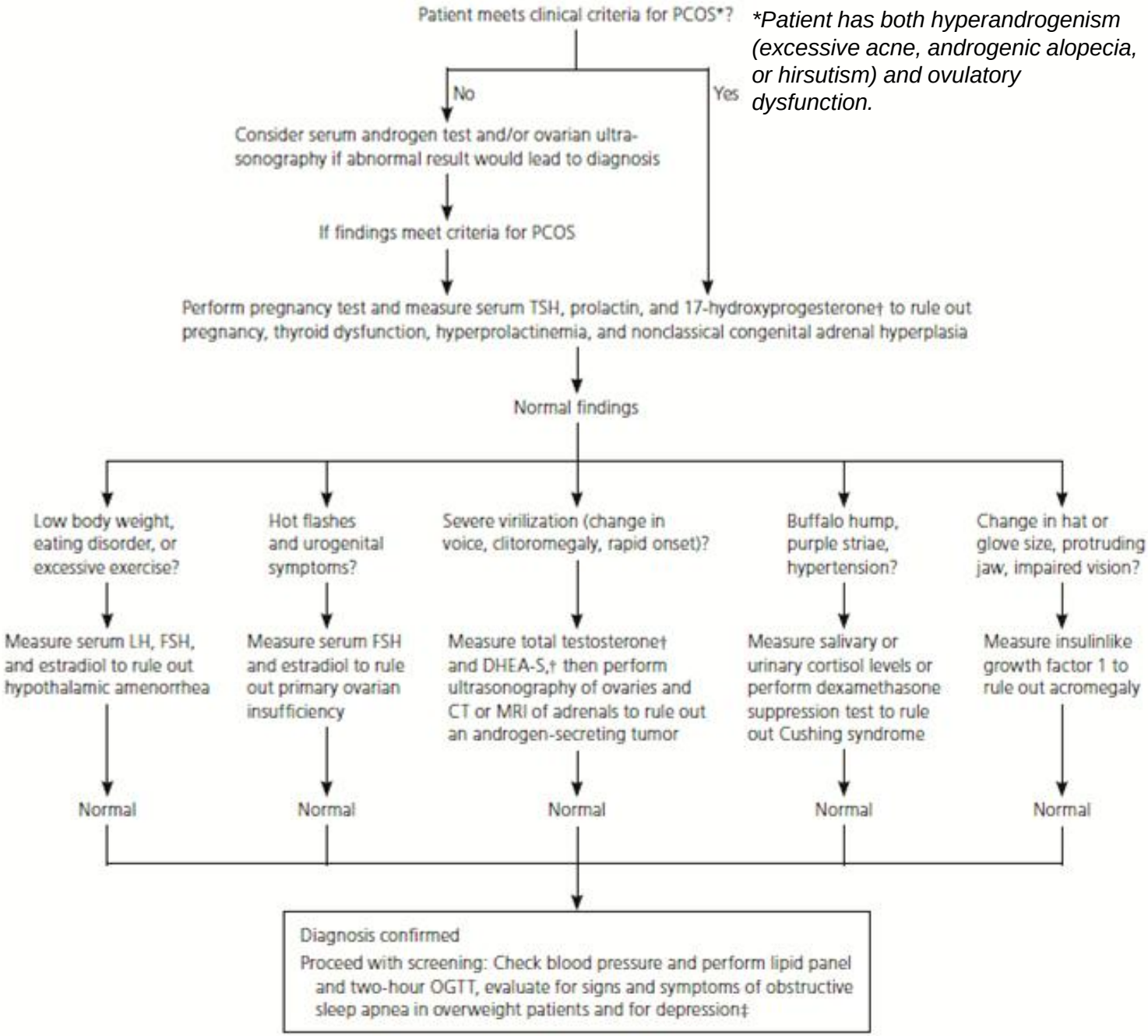
- AMH is the best single serum test for ovarian response management. PCOS is significantly associated with elevated serum AMH both with NIH criteria and with Rotterdam criteria.

- Serum AMH levels improve menopause prediction, monitoring of ovarian damage, and identification of women at risk for PCOS and premature or primary ovarian insufficiency. It provides insight intos subphenotypes of PCOS with higher serum AMH predicting longer menstrual cycle length, higher luteinizing hormone (LH) levels, and hirsuitism.

- However, it can have dramatic variability due to common, biologic fluctuations within some individuals, use of hormonal contraceptives or other medications, certain surgical procedures, specimen treatment, assay changes, and laboratory calibration differences.

Leader B. Curr Opin Obstet Gynecol 2014, 26:226–236

Diagnostic Algorithm for PCOS



**Patient has both hyperandrogenism (excessive acne, androgenic alopecia, or hirsutism) and ovulatory dysfunction.*

https://www.aafp.org/afp/2016/0715/p106.pdf

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Key Recommendations for Practice

Clinical recommendation
All women diagnosed with PCOS should be screened for metabolic abnormalities (e.g., type 2 diabetes mellitus, dyslipidemia, hypertension), regardless of body mass index.
All women with suspected PCOS should be screened for thyroid disease, hyperprolactinemia, and nonclassical congenital adrenal hyperplasia.
A calorie-restricted diet is recommended for all patients with PCOS who are overweight. Weight loss has been shown to have a positive effect on fertility and metabolic profile.
Hormonal contraception (e.g., oral contraceptives) should be used as the initial treatment for menstrual cycle irregularity, hirsutism, and acne in patients with PCOS who are not actively trying to get pregnant.

https://www.aafp.org/afp/2016/0715/p106.pdf

Screening for Medical Conditions Associated with PCOS

Suggested screening tests:

- Lutenising hormone
- Follicle-stimulating hormone
- Total testosterone, sex hormone-binding globulin
- Lipid profile
- Fasting glucose with or without oral glucose tolerance test, glycated haemoglobin
- Serum prolactin
- Thyroid function
- Serum ferritin
- 25-hydroxy vitamin D

If clinically indicated:

- 17-hydroxyprogesterone
- 1 mg overnight dexamethasone suppression or 24-hour urine-free cortisol
- Sleep study

Lua ACY. Singapore Med J 2018; 59(11): 567-571

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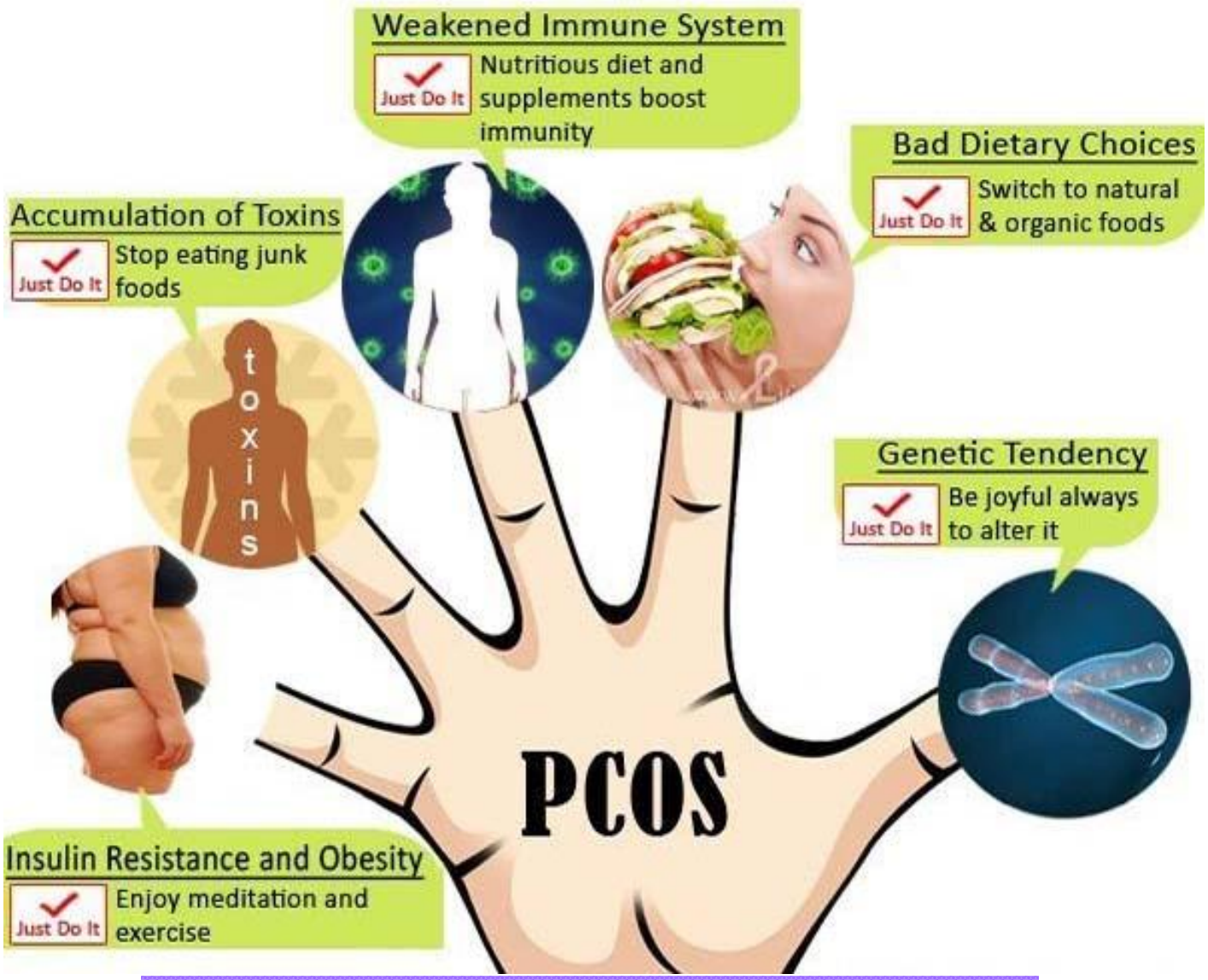
Tests Done in SRL

TEST	METHOD	CODE
PCOD Panel (LH, FSH, Prolactin, Testosterone (Total & Free), Insulin (Fasting & PP), Glucose (Fasting & PP)	Spectophotometry/ Chemiluminecence/ Dipstick	1011
AMH (Anti-Müllerian Hormone)/ Müllerian Inhibiting Substance (MIS)	CLIA	1705


Weakened Immune System
Just Do It
Nutritious diet and supplements boost immunity
Bad Dietary Choices
Just Do It
Switch to natural & organic foods
Accumulation of Toxins
Just Do It
Stop eating junk foods
toxins
Genetic Tendency
Just Do It
Be joyful always to alter it
PCOS
Insulin Resistance and Obesity
Just Do It
Enjoy meditation and exercise

Thank You