

CHAPTER I

WHAT EXACTLY IS PCOS?

Polycystic ovary syndrome (PCOS) is a metabolic disorder that disrupts your hormones, typically giving you higher-than-normal levels of certain sex hormones and insulin, which can trigger symptoms such as irregular (or no) periods, acne, excess hair and weight gain. You may also have a number of cysts on your ovaries – these show up as dark blobs on an ultrasound scan. These are in fact empty egg follicles in a state of ‘suspended animation’, waiting for the right balance of sex hormones to come along and activate them. About one in 10 women in the UK, US and Australia develops the condition.¹

Most women with PCOS start to notice symptoms in their late teens or twenties. There’s a range of symptoms,² but you’re likely to have one or more of the following:

- absent, infrequent or irregular periods due to the imbalance of hormones

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- subfertility, as you need to ovulate to become pregnant and some women with PCOS don't ovulate regularly or at all
- acne which lasts longer than the normal teenage years – this happens if you produce too much testosterone
- obesity or weight gain
- insulin resistance: a higher-than-normal amount of insulin in your body, which creates an imbalance with other hormones and puts you at increased risk of Type 2 diabetes (by up to 40 per cent by age 40)
- excess hair (hirsutism) – if you produce too much testosterone – which can develop in places such as the face, chest and tummy
- alopecia (thinning hair) particularly at the top of your head and on your temples if you produce too much testosterone
- Long-term health risks.³ Women with PCOS tend to have a higher-than-normal risk of developing diabetes and a high cholesterol level later in life. It also increases your risk of having a stroke and developing uterine cancer.

HOW TO GET A DIAGNOSIS

If you suspect that you've got PCOS, you'll need to see your doctor. If your GP also suspects that you have PCOS, they may refer you to a hospital specialist in endocrinology (medicine relating to hormones) or a gynaecologist (a specialist in women's reproductive systems and hormones).

There are ways⁴ to confirm if you have PCOS:

1. Talking to your GP: your doctor will look out for typical symptoms such as menstrual disturbance, hyperinsulinaemia or insulin resistance (we'll discuss this in more detail later on), hair and skin problems, and obesity. These aren't foolproof indications, however, as you can have other symptoms, too. For instance, though many women with PCOS have irregular or absent periods, and many have menstrual cycle lengths greater than 35 days, you can still have PCOS even if your cycles are regular. And only around 40–60 per cent of women with PCOS are obese,⁵ so you may not be overweight. There's also a distinct group of thin PCOS patients who may have even more firmly entrenched hormonal and fertility problems than their obese counterparts. And not all patients are excessively hairy but may have other problems such as acne. So your doctor can do medical tests, too.
2. Laboratory testing: Blood tests measure the levels of certain hormones so that a diagnosis of PCOS can be made. There's considerable disagreement in the medical community about which tests to use, but generally the following are tested: FSH (follicle-stimulating hormone), LH (luteinizing hormone), total testosterone, sex hormone-binding globulin, prolactin, thyroid-stimulating hormone, fasting insulin and glucose levels. These are best obtained in the first 2–3 days after the onset of a period. A blood lipid profile should be part of every evaluation, as should a glucose tolerance test and a test to measure insulin levels.
3. Ultrasound scan: Transvaginal ultrasound⁶ is a way for your pelvis and ovaries to be 'mapped' to see if your ovaries look as if they are affected by PCOS. A hand-held probe is inserted directly into the vagina to scan the pelvic structures, while ultrasound pictures are viewed on a

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monitor. The test can be performed to evaluate women with infertility problems, abnormal bleeding, sources of unexplained pain and to diagnose PCOS by looking for slight enlargement of the ovaries and the empty follicles that show up as black ‘blobs’ on the scan (see diagram on page 9).

HOW DOES PCOS AFFECT MY OVARIES?

You have two ovaries, small organs inside your body where the egg cells are produced and stored. At puberty the number of fully-formed cells is around 300,000 – and when your body’s reproductive system is activated by puberty’s cascade of sex hormones, pumped into your bloodstream by the ovaries and adrenal glands, then each month about 20 of these egg cells, each encased in a sac called a follicle, begin to mature. One follicle eventually becomes dominant while the others shrink away. The egg within the dominant follicle continues ripening to maturity, then exits the ovary and enters the adjacent fallopian tube either to be fertilized or, if conception doesn’t happen, expelled from the body during menstruation.

But this normal cycle relies on a complex web of hormones being present at the right time, in the right amounts, for ovulation to happen. Having PCOS often interferes with this, affecting your ovaries’ abilities to nurture, mature and release an egg each month.

The best way to get to grips with how your ovaries are affected by PCOS is to compare a ‘normal’ menstrual cycle with a typical PCOS cycle.

THE NORMAL MENSTRUAL CYCLE

The length of the menstrual cycle can vary from a short 21 days to a long cycle of 40 days. The length of the cycle is calculated by counting the first day of bleeding as Day 1 and then counting until the very last day before the next bleed (period). The average menstrual cycle is commonly described as 28 days, although this may be true for only one in 10 women.

In a normal menstrual cycle lasting approximately 28 days, the first half (called the follicular phase) starts on the first day of your period and lasts for about 14 days. In this phase the pituitary gland releases low levels of FSH (follicle-stimulating hormone) to stimulate the follicles in the ovary to ripen their eggs and produce the hormone oestrogen, which causes the lining of the womb to start to thicken in preparation for pregnancy. When levels of oestrogen are high enough, the pituitary gland produces a large amount of LH (luteinizing hormone) and the dominant matured follicle in the ovary releases its egg into the fallopian tubes towards the womb.

After ovulation comes the second stage of the menstrual cycle, called the luteal phase. Here the cells from the burst follicle collapse to form a 'cyst', or new kind of follicle, called the *corpus luteum*. The corpus luteum now produces progesterone as the main hormone of the second half of the cycle. Progesterone causes the thickened lining of the womb to secrete nutrients ready to receive the fertilized egg. If the egg is fertilized by a sperm following intercourse it will implant itself in the womb lining, and the corpus luteum will continue to grow to protect the pregnancy. If it isn't fertilized 14 days after ovulation, the corpus luteum stops producing progesterone and oestrogen. The thickened womb lining breaks down and is shed as a period, ready for the whole cycle to start again.

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WHAT HAPPENS DURING A PCOS CYCLE?

The diagram opposite shows a normal menstrual cycle compared to a PCOS cycle. With PCOS, LH levels are often high when the menstrual cycle starts. The levels of LH are also higher than FSH levels. Because the LH levels are already quite high, the surge that sets off the chain-reaction causing ovulation doesn't happen. Without this LH surge, ovulation doesn't occur and periods are irregular.

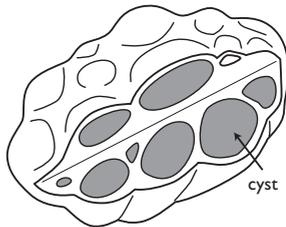
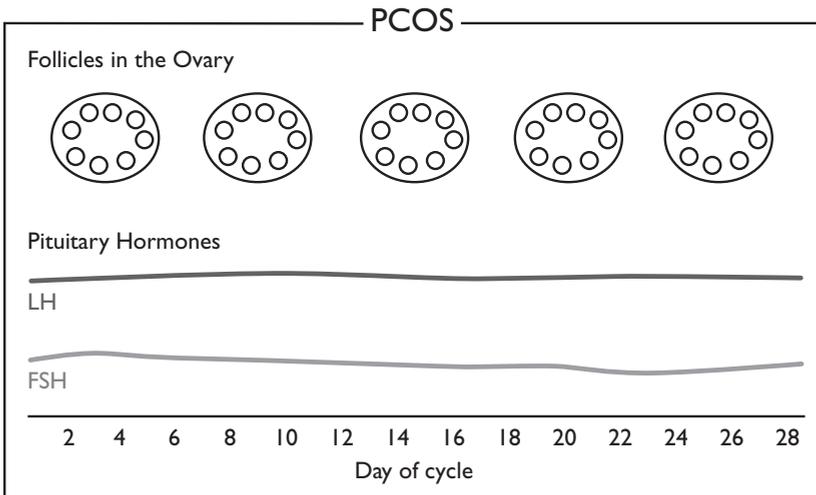
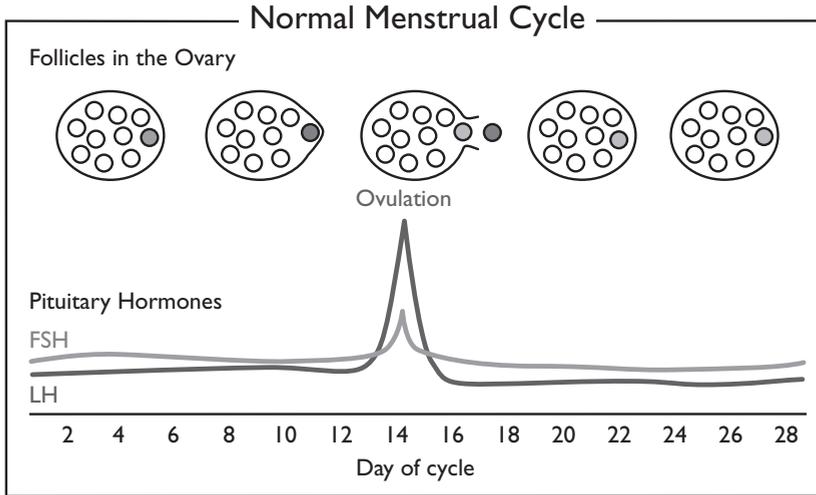
WHAT DOES A POLYCYSTIC OVARY LOOK LIKE?

Polycystic means 'many cysts' and gives the condition its name, but in actual fact in PCOS, the word 'cyst' simply means an empty egg follicle. A polycystic ovary usually has 8 to 12 or more cysts on its surface. Each cyst measures 2–9 mm in size (see diagram opposite).

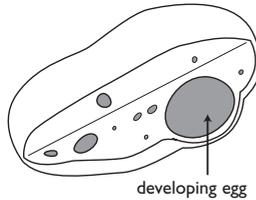
A cyst is a fluid-filled sac, and in PCOS that means the empty follicles that are in 'suspended animation' – not given the right hormones in the right amounts at the right time. If you've got polycystic ovaries the follicles may stop growing too early, preventing the release of an egg. Instead of bursting to release the egg, they gradually build up on the ovaries to form lots of small cysts which are actually swollen egg chambers waiting for the right hormone to trigger the maturation and release of an egg.

There's a characteristic pattern of ovarian enlargement to 1.5 to 3 times normal size, and a number of small cystic structures of less than 10 mm, which are usually located in a circle around the ovarian surface, commonly called a 'string of pearls'.

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Polycystic Ovary



Normal Ovary

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DOES PCOS MEAN I HAVE OVARIAN CYSTS?

Ovarian cysts are a common but usually unrelated gynaecological disorder. They differ from polycystic ovaries in that they 1) are typically found *within* the ovary 2) they occur singly and not in groups and 3) can, if left untreated, become cancerous. Polycystic ovaries, on the other hand, are neither cancerous nor are they likely to become so.

WHAT CAUSES PCOS?

PCOS continues to perplex even the medical experts⁷ who specialize in it. We know that there's a very strong genetic and hereditary basis of PCOS,⁸ but even if two women have the same gene they may end up with different symptoms, depending on their environment and lifestyle.

📦 TIME FOR A NAME CHANGE?

As the 'cysts' in PCOS aren't actually cysts at all, and because a woman who's had her ovaries removed can still have PCOS symptoms, some scientists are calling for a name change for the condition – if the underlying metabolic condition affects your ovaries, then your ovaries aren't the cause and shouldn't be the main focus of the name.

'Polyfollicular syndrome' has been suggested, as have 'ovarian dysmetabolic syndrome', 'Syndrome O', 'cystic ovaries', 'functional hyperandrogenism', 'Stein-Leventhal syndrome' and 'chronic anovulation'.

It's fantastic that the condition has become a talking point among medical specialists, and while PCOS may be an imperfect name, whatever the

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syndrome is eventually called, it matters most that it's recognized, evaluated and treated.

The effect of environment and lifestyle is also clear because you can have polycystic ovaries (PCO) without having the syndrome (PCOS).

With pelvic ultrasound it has been found that approximately 20–30 per cent of women of reproductive age will have polycystic ovaries, but only about half of these will have the signs or symptoms of PCOS. If the otherwise 'normal' group is examined closely, experts⁹ believe they may be experiencing the subtle hormonal changes associated with PCOS, but just have them under control, perhaps due to diet, exercise and lifestyle factors. But women with PCO are thought to be predisposed to develop PCOS if those lifestyle factors change, and if they do it could have a significant impact on their long-term health, such as an increased risk of diabetes and heart disease.

It's also possible to have PCOS symptoms but *not* have polycystic ovaries on a scan. This makes sense if you think that the ovarian changes are just another symptom of the underlying cause of PCOS – which we'll talk about in the next chapter.

'When I was finally diagnosed with PCOS the relief was incredible.

Knowing what is wrong with me gives me choices.'

Susan, 38

CHAPTER 2

WHAT CAUSES PCOS?

The search for the underlying cause of PCOS is ongoing. Here's what researchers have uncovered so far.

IT'S ALL IN THE GENES!

Researchers have noticed that PCOS tends to run in families, and a number of studies¹ suggest that genes play a part in developing the syndrome. A gene is a basic unit of heredity; bits of DNA that direct the reproduction, growth and function of cells. Symptoms are fairly easy to track down through the generations. There may be early male-pattern baldness in men (where the hairline recedes at the front and on the crown) and PCOS symptoms in women. The long-term health risks of PCOS – such as diabetes, high blood pressure and obesity – can also be seen in both sexes,

and it's thought that if a woman has PCOS, then her immediate family members have a 50–50 chance of having it too.

➤ CAN GUYS HAVE PCOS?

Some researchers believe that the PCOS gene can be passed down in men as well as women. Obviously it's harder to diagnose in men, because they don't have ovaries and don't have periods, and what would be considered hirsutism (excess hair) in women would be considered normal hair distribution in men. Still, a number of different findings have suggested a pattern of symptoms which, if found together, may represent the male counterpart of PCOS:

- Increased number of hair follicles
- Low sperm count
- Premature balding
- Insulin resistance
- Weight gain in the stomach area
- Increased risk of diabetes and heart disease.

All this is currently speculative, but the signs that link some aspects of PCOS to male relations² of women with PCOS adds weight not only to the pattern of inheritance theory but also to the ongoing argument against the appropriateness of the current name for the broad spectrum of symptoms associated with PCOS.

PCOS also seems to be more common among women from southern Asia than in white Caucasian women, but no one yet knows why.

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Researchers are currently using gene technology to try and discover if any specific genes trigger PCOS. They need several hundred families to take part and the process can take decades. So far, studies that have concentrated on genes controlling oestrogen and progesterone have found no genetic link. But an interesting 1997 study³ showed that in PCOS a faulty gene may be involved in the first stage of testosterone production, and could account for the raised levels of this hormone often seen in women with PCOS. It's possible that this gene may interact with other genes and with the environment to produce PCOS. Another study⁴ revealed that there may be a link between a specific variation in the insulin gene and the failure to ovulate in women with PCOS.

Other research suggests that PCOS may represent the final outcome of different, deeply inter-related genetic abnormalities and environmental factors that influence each other and perpetuate the syndrome.⁵ Most women dealing with the condition believe this to be true. We all know that if we're stressed or put on weight or don't exercise, it affects our symptoms.

Research into the genetics of PCOS continues – but what's in it for us? If we can discover what genes trigger the syndrome, medical companies hope to develop medicines based on this knowledge, and perhaps even tests that can show very early on in life whether a person has PCOS or not, so you could create a diet and lifestyle to combat the problem, right from the start.

'The biochemistry of PCOS is fascinating – but even more gripping is the realization that here is a genetic condition where, although there is no cure, sufferers can control the outcome through diet and lifestyle,' says Dr Adam Carey, reproductive endocrinologist and nutritionist. 'It is a condition where women really can use their environment to interact with their genetic programming and create a positive outcome.'

TOO MUCH MALE HORMONE?

Another theory about what causes PCOS is that women with the condition produce too much testosterone – a hormone known as the ‘male’ hormone because men produce 10 times more than women. In PCOS, the excess testosterone finds its way into the body’s circulation and triggers the familiar PCOS symptoms of hair loss, facial hair and acne. Testosterone can also be converted into oestrogen in the fat stores of the body. The result: weight gain and hormonal havoc.

It appears that a malfunction with the hypothalamus–pituitary regulation of the menstrual cycle in women with PCOS causes the release of abnormal levels of hormones, in particular testosterone. Not only do high levels of luteinizing hormone (LH) stimulate the production of testosterone in the ovaries, but when the ovaries aren’t working as they should they become thickened, and this thickening produces even more testosterone.

Several studies have linked excess androgens (male hormones, including testosterone) with PCOS. Testosterone is the most often cited, but research⁶ has also suggested that PCOS may be the result of a surge of another male hormone, adrenal androgen DHEA. DHEA is responsible for the production of pubic and armpit hair in puberty. This has yet to be proved conclusively, but it’s interesting as many women with PCOS date the beginning of their problems from puberty, when male hormones first surge.

‘I was 15 when I first noticed something was wrong. My friends had mild acne, but my face exploded. My friends started their periods, but I didn’t.’

Laura, 21

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Some experts believe that even you haven't got high levels of testosterone you may become more sensitive to it if you have PCOS, and go on to develop symptoms associated with testosterone excess because of that sensitivity, rather than increased levels. This could explain why some women with PCOS don't show high testosterone levels in blood tests, even though they have the symptoms.

Testosterone is carried in the bloodstream by a protein called sex hormone-binding globulin (SHBG). Higher-than-normal insulin levels in the bloodstream can suppress the production of SHBG so that the amount of unbound (active) testosterone is raised – the reason why some women with high insulin levels (common if you're overweight) can have signs of testosterone excess even when tests reveal a normal level in the blood.

⇒ HOW MUCH IS TOO MUCH?

The normal blood testosterone level in women should be around 0.5–3.5 nmol per litre (a small measure of a substance in a solution); in men usually 15–30 nmol per litre. Women with PCOS tend to have a testosterone level of 2.5–5.0 nmol per litre. If the level goes higher than 5.0 nmol then other problems such as congenital adrenal hyperplasia and ovarian tumours need to be ruled out.

Mild testosterone excess in women can cause symptoms such as acne, hirsutism and alopecia (thinning hair on the head) and these symptoms are often called androgenization or hyperandrogenism. It's important to point out, though, that testosterone levels in women with PCOS don't usually get so high as to cause a condition called virilization, which is when the voice gets deeper, breasts shrink and the clitoris enlarges.

TOO MUCH LH?

High blood levels of the pituitary hormone LH are also commonly found in women with PCOS, and higher-than-normal LH levels can trigger the production of testosterone and the familiar symptoms of PCOS.⁷

The high levels of LH may be due to lack of ovulation, as both oestrogen and progesterone inhibit the production of LH, but some women with PCOS and regular ovulations also have high LH levels, indicating that in some cases there may be a problem with the pituitary gland itself or with its ability to interact with the ovaries.

BLAME IT ON THE INSULIN!

In the last few years, research^{8,9} has discovered that a condition known as *insulin resistance* plays an important role in the cause of PCOS. Major reviews on the subject suggest that up to 70 per cent of women with PCOS who are overweight can have insulin resistance, and around 30 per cent of women who are slim can have it, too.

Women with insulin resistance have raised levels of insulin in their bloodstream, and high levels of insulin have been shown to stimulate the ovaries to produce more testosterone and lower blood levels of SHBG, resulting in higher and more active levels of testosterone.

'I only found out I had insulin resistance as well as PCOS when I got pregnant. Tests revealed that my blood sugar levels were all over the place.'

Alice, 36

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➤ WHAT IS INSULIN RESISTANCE?

Insulin is a powerful hormone released by your pancreas in response to eating food – especially carbohydrates. It transports sugar out of the blood and into muscle, fat and liver cells, where it's converted to energy or stored as fat. Many women with PCOS have insulin resistance. This means that the process of getting the sugar out of the blood and into the cells is defective – the cells are 'resistant' to insulin. The pancreas must secrete more and more insulin to get sugar out of the blood and into the cells. High levels of insulin, or *hyperinsulinaemia*, can trigger weight gain, problems with ovulation, an increased risk of diabetes, difficulty losing weight and an increased risk of heart disease by raising LDL (the unhealthy cholesterol) and triglyceride levels and decreasing HDL (the healthy cholesterol).

THYROID PROBLEMS

Your thyroid is a gland at the bottom of your neck. It weighs less than an ounce but has an enormous effect on your health. All aspects of your metabolism, from the rate at which your heart beats to how quickly you burn calories, are regulated by your thyroid hormones.

If your thyroid releases the proper amount of hormones, body systems function normally. But if your thyroid doesn't produce enough it causes *hypothyroidism* (underactive thyroid), and upsets the delicate balance of chemical reactions in your body. Symptoms include fatigue, weight gain, irregular periods and high blood pressure (sound familiar?). If you're overweight and have irregular periods and insulin resistance, it seems your risk of developing hypothyroidism is higher.

Many of the symptoms of hypothyroidism correspond with the symptoms of PCOS, and there do seem to be strong links between the two conditions. At present there just isn't enough evidence to suggest that thyroid problems may have a causal link with PCOS, but early research¹⁰ suggests there may well be a connection of some kind.

An interesting study illustrated this by investigating the relationship between polycystic ovary syndrome, hypothyroidism and insulin-resistance and how, by submitting patients to a specific therapy for any one of these three problems, the researchers were able to obtain an improvement in the other associated conditions.¹¹

This study suggests that there are several ways to improve PCOS symptoms and increase fertility. If a single therapy can be effective, a combination might be even better.

THE CORTISOL CONNECTION

There may also be a link between PCOS and the production of the stress hormone cortisol. Studies¹² have indicated that high testosterone levels associated with PCOS could be caused by a fault in the way the body produces Cortisol. This is the active form of the hormone released into the body by the adrenal gland to help it cope with stress and is turned into cortisone, the inactive form, by enzymes in the body. Researchers have found that some women with PCOS don't have these enzymes. This means their bodies cannot process cortisol properly, causing higher levels of testosterone to be produced.

This suggests that stress may play a part in the development of PCOS. If you're under stress your adrenal glands release the stress hormones –

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adrenaline and cortisol, as well as testosterone – to help you cope with that stress. If there's a problem with the conversion of cortisol, you produce too much testosterone and this makes your symptoms worse and drives your body towards the classic PCOS symptoms of insulin resistance, weight gain and irregular periods. More research needs to be done, but knowing that stress may be a contributory factor can help you to take steps to 'stress-proof' your life, and you can do this with our action plan on page 266.

THE ENDOCRINE WEB

All these hormone theories – insulin, testosterone, LH, cortisol and thyroid problems – are in fact linked. This is because the endocrine (hormone) system regulating your blood sugar and insulin levels, as well as your sex hormones and stress hormones, is a sensitive web of interconnections. If one hormone is out of kilter, the others will be affected, too.

'We know that normal ovulation requires the perfect synchronization of hormones in the body. PCOS causes shifts in hormone levels, rendering normal ovulation unlikely. The lack of ovulation is largely to blame for the infertility aspect of PCOS, while the hormone imbalance is responsible for the associated symptoms of unwanted hair growth and acne.'¹³

Clearly in PCOS there are hormonal imbalances, but we still don't know which one is ultimately responsible for triggering the chain-reaction that causes PCOS symptoms or, in fact, if it's something external that jump-starts the imbalance.

COULD IT START IN THE WOMB?

Some researchers believe that PCOS is caused before you are born. A slight increase in testosterone levels occurs during pregnancy, especially in the first 14 weeks when the foetus' ovaries are developing. The placenta has a large amount of an enzyme called aromatase which converts testosterone into oestrogen, but there have been reports of female foetuses becoming masculinized by androgen-secreting tumours. This suggests the possibility that an excessive amount of male hormones could alter a female foetus' developing ovaries.

It's also been suggested that insulin resistance may start in the uterus. If the mother is nutrient deficient, it's possible that she sends a signal to her foetus that starvation is a possibility. The foetus, therefore, becomes insulin resistant as in times of famine, because the fat storage that this encourages has certain advantages. So far, studies¹⁴ haven't confirmed this hypothesis, but if it were true then low-weight or small babies would have a higher risk of PCOS, when in fact the opposite is true: research¹⁵ has shown that babies who are overweight and overdue have a higher risk of developing PCOS later in life.

IS YOUR WEIGHT TO BLAME?

Being overweight increases insulin levels dramatically and makes PCOS symptoms worse. Studies¹⁶ have shown that losing weight can not only reduce the symptoms of PCOS but can also help normalize ovulation, boost fertility and resolve hormonal problems.

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Weight loss is so beneficial because it results in lower insulin levels, which in turn can reduce testosterone levels. Trouble is, as you'll see in Part 2, if you've got PCOS you're far more likely to have difficulty losing weight.

But does weight gain *cause* PCOS? Even though a woman with PCO who puts a lot of weight on might start to get PCOS symptoms, most experts believe that weight gain is a symptom, not a cause, of the syndrome, because research¹⁷ shows that slim women can and do report PCOS symptoms too.

DIET AND LIFESTYLE TRIGGERS?

Fertility studies indicate that both eating disorders and poor diets (e.g. diets high in fat, sugar and carbohydrate and low in nutrients) can and do affect the function of the ovaries. This is because a poor diet triggers the release of too much insulin, increasing the risk of an overproduction of testosterone and PCOS. And it's been suggested¹⁸ that nearly two-thirds of women with bulimia may have PCOS.

So does a poor diet cause PCOS, or does PCOS trigger fad dieting because of the need to control weight gain, or even bingeing and purging due to sugar cravings set off by insulin resistance? The jury's still out, though many women with PCOS believe the link is there.

'I know science has yet to prove it, but I certainly believe my own PCOS was made a lot worse by my bingeing and starving cycle. As a teenager I was desperate not to be so dumpy and starved myself on stupid diets, but my spots, my weight and my irregular periods just got worse and worse.'

Emma, 32

Some researchers¹⁹ believe that when PCOS runs in families it isn't because of a genetic reason; rather other factors common in families – typically a poor diet and lack of exercise leading to overproduction of insulin. Again, all this has yet to be proved conclusively, but what we do know for sure is that one of the best ways to manage PCOS is to clean up your act when it comes to diet and lifestyle. Part 2 will give you plenty of advice on how to do just that.

'For centuries, experts in the studies of philosophy, science and medicine have pondered the question of how much of who we are is inherited and how much in due to environment. There is no medical issue that begs the answer for this question more than does PCOS.'²⁰

HORMONE DISRUPTERS

Xenoestrogens or endocrine-disrupting chemicals (EDCs) are widely recognized to be highly toxic in the smallest doses. Despite this, they exist throughout our environment, from pesticide residues on food to pollution in our air and water to medications and the high-sugar, preserved and processed fast foods in our diet.

EDCs are characterized as 'hormone disrupters' because they have a molecular structure similar to the hormone oestrogen and can interfere with the natural process of your hormones. They trick your body into a condition known as oestrogen excess or oestrogen dominance, and the resulting hormonal imbalance can trigger a wide variety of PCOS symptoms, from irregular periods and acne to dry hair and weight gain.

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'You hear so much about pollution reducing men's sperm counts, but no-one talks about how the same pollution affects women. I want to know more!'

Aileen, 37

Research²¹ about how EDCs affect or trigger PCOS is still in its infancy, but we know enough to suggest that exposure to hormone-disrupting toxins could be a contributory factor – that's why you'll find a chapter in Part 2 devoted to this important issue.

IS IT ALL IN THE MIND?

Does PCOS have something to do with your mental or emotional state? Some researchers believe that it might, in two ways: first, studies²² show it may be caused or triggered by epilepsy or at least one of the medications routinely used (depakote or valproate) to treat epileptic seizures. Second, other studies²³ indicate that PCOS may worsen mood and anxiety symptoms.

This is a controversial area of research with potentially huge consequences for the recognition and treatment of PCOS as not just a hormonal disorder but also a mood disorder.

If you've got PCOS you probably don't need a study to tell you that the symptoms can turn your mood black and crank up your anxiety levels from time to time – that's why Part 3 of this book is packed with advice on stress-reduction and getting yourself in the right frame of mind to take charge of your mood and your symptoms.

BETA CELL FUNCTION

Insulin is produced by the beta cells of the pancreas; researchers are currently investigating whether women with PCOS have a beta-cell function that is more responsive to insulin resistance than women without PCOS. Early studies²⁴ indicate that this may indeed be the case. Further research in this field could well lead to discoveries of new therapies and better diagnoses for women with PCOS and insulin resistance.

METABOLIC SYNDROME (SYNDROME X)

Metabolic Syndrome or Syndrome X is a term used to describe a set of risk factors that increase the risk of heart attack by 4 to 20 times. These factors include insulin resistance, weight gain around the tummy, high levels of blood fats and high blood pressure. It's thought to be caused by the body's inability to process a diet high in sugary foods and refined carbohydrates. These refined carbohydrates not only drive the body to insulin resistance but also fail to supply the many nutrients the body needs for hormones to function at optimum levels.

Many women with PCOS have symptoms of Syndrome X – and as it seems possible that men could get PCOS too (see page 13) – could PCOS simply be a female version of symptoms that are triggered by Metabolic Syndrome? Could Syndrome X be the cardiologist's view of what a gynaecologist would call PCOS? Much more research²⁵ needs to be done.

HOW DO THESE THEORIES HELP ME?

In the end, the most important thing about all the research into PCOS is that it will help scientists, the medical community, natural health practitioners and women who have PCOS to work out the best ways of dealing with it. But the underlying results of most research so far has one thing in common – the best thing any woman with PCOS can do for herself is to take charge of her environment – diet, lifestyle, emotional health – in order to redress the hormonal imbalances within her endocrine system and restore better health. That’s why Parts 2 and 3 of this book are packed with practical information on how to get the help that works best for you and your specific symptoms. And the best thing about these self-help measures is that you can use them with whatever type of medication you decide to take.

Chapter 5 will take a look at what the medical community can offer, but before we launch into medication let’s complete this preliminary overview of PCOS by taking a look at how it affects your hormonal life stages from puberty to the menopause and beyond.