

TESTOSTERONE – Zeus. King of the male hormones, he is dominant, aggressive, and all-powerful. Focused and goal-oriented, he feverishly builds all that is male, including the compulsion to outrank other males in the pecking order. He drives the masculine sweat glands to produce the come-hither smell of manhood – androstenedione. He activates the sex and aggression circuits, and he's single-minded in his dogged pursuit of his desired mate. Prized for his confidence and bravery, he can be a convincing seducer, but when he's irritable, he can be the grouchiest of bears.

VASOPRESSIN – The White Knight. Vasopressin is the hormone of gallantry and monogamy, aggressively protecting and defending turf, mate, and children. Along with testosterone, he runs the male circuits and enhances masculinity.

MÜLLERIAN INHIBITING SUBSTANCE (MIS) – Hercules. He's strong, tough, and fearless. Also known as the Defeminizer, he ruthlessly strips away all that is feminine from the male MIS builds brain circuits for exploratory behavior, suppresses brain circuits for female-type behaviors, destroys the female reproductive organs, and helps build the male reproductive organs and brain circuits.

OXYTOCIN – The Lion Tamer. With just a few cuddles and strokes, this "down, boy" hormone settles and calms even the fiercest of beasts. He increases empathic ability and builds thrust circuits, romantic-love circuits, and attachment circuits in the brain. He reduces stress hormones, lowers men's blood pressure, and plays a major role in father's bonding with their infants. He promotes feelings of safety and security and is to blame for a man's "postcoital narcolepsy."

PROLACTIN – Mr. Mom. He causes sympathetic pregnancy (cauvade syndrome) in fathers-to-be and increases dad's ability to hear their babies cry. He stimulates connections in the male brain for paternal behavior and decreases sex drive.

CORTISOL – The Gladiator. When threatened, he is angry, fired up, and willing to fight for life and limb.

ANDROSTENEDIONE – Romeo. The charming seducer of women. When released by the skin as a pheromone he does more for a man's sex appeal than any aftershave or cologne.

DOPAMINE – The Energizer. The intoxicating life of the party, he's all about feeling good, having fun, and going for the gusto. Excited and highly motivated, he's pumped up to win and driven to hit the jackpot again and again. But watch out – he is addictively rewarding, particularly in the rough-and-tumble play of boyhood and sexual play of manhood, where dopamine increases ecstasy during orgasm.

ESTROGEN – The Queen. Although she doesn't have the same power over a man as Zeus, she may be the true force behind the throne, running most of the male brain circuits. She has the ability to increase his desire to cuddle and relate by stimulating his

oxytocin.

INTRODUCTION

In reality, the male brain is a lean, mean problem-solving machine. (2)

In the female brain, the hormones estrogen, progesterone, and oxytocin predispose brain circuits toward female-typical behaviors. In the male brain, it's testosterone, vasopressin, and a hormone called MIS (Müllerian inhibiting substance) that have the earliest and most enduring effect. (3-4)

[...] men have two and a half times the brain space devoted to sexual drive in their hypothalamus. (4)

[...] our culture and how we are taught to behave play a big role in shaping and reshaping our brains. (6)

CHAPTER ONE

THE BOY BRAIN

[...] unlike girls, who are inclined to look long and hard at faces, boys' visual circuits pay more attention to movement, geometric shapes, and the edges and angles in objects from the get-go. (12)

During fetal development, [boy] brain [is] built in two stages, First, during weeks eight to eighteen, testosterone from his tiny testicles *masculinize[s]* his body and brain, forming the brain circuits that control male behaviors. As his brain [is] marinating in testosterone, that hormone beg[ins] to make some of his brain circuits grow and to make others wither and die.

Next, during the remaining months of pregnancy another hormone, MIS [...] join[s] with testosterone and *deformize[s]* his brain and body. They suppress his brain circuits for female-type behaviors and kill off the female reproductive organs. His male reproductive organs, the penis and testicles, gr[ow] larger. Then, together with testosterone, MIS may have help form [boy's] larger male brain circuits for exploratory behavior, muscular and motor control, spatial skills, and rough play. Scientists discovered that when they bred male mice to lack the MIS hormone, they did not develop male-typical exploratory behavior. Instead, they behaved and played more like females. The female brain circuits that make a girl a girl are laid down and develop without the effects of testosterone or MIS. (12-13)

From birth until a boy is a year old, a period that scientists call infantile-puberty, his brain is being marinated in the same high levels of testosterone as in an adult man. And it's his testosterone that helps stimulate a boy's muscles to grow larger and improves his motor skills, preparing him for rough-and-tumble play. After the year of infantile-puberty, a boy's testosterone drops, but his MIS hormone remains high. Scientists call this period, from age one to ten, the juvenile pause. They believe that the MIS hormone may form and fuel his male-specific brain circuits during his ten-year period, increasing his exploratory behavior and rough play. (14)

By age five, according to researchers in Germany, boys are using different brain areas than girls to visually rotate an object in their mind's eyes. The boys mentally rotated the pictures of the objects by using both sides of their brains' spatial-movement area in the parietal lobe. Girls used only one side to do the task. (26-27)

CHAPTER TWO

THE TEEN BOY BRAIN

From [fourteen] on, testosterone would biologically masculinize all the thoughts and behaviors that emerge from his brain. It would stimulate the rapid growth of male brain circuits that were formed before he was born. It also would enlarge his testicles, activate the growth of his muscles and bones, make his beard and pubic hair grow, deepen his voice, and lengthen and thicken his penis. But just as dramatically, it would make his brains' sexual-pursuit circuits, in his hypothalamus, grow more than twice as large as those in girls' brains. The male brain is now structured to push sexual pursuit to the forefront of his mind. (32)

The sleep clock in a boy's brain begins changing when he's eleven or twelve years old. Testosterone receptors reset his brain's clock cells – in the suprachiasmatic nucleus, or SCN – so that he stays up later at night and sleeps later in the morning. By the time a boy is fourteen, his new sleep set point is pushed an hour later than that of girls his age. This chronobiological shift is just the beginning of being out of sync with the opposite sex. From now until his female peers go through menopause, he'll go to sleep and wake up later than they do. (36)

[...] scientists have discovered that the pleasure center in the teen boy brain is nearly numb compared with the area in adults and children. The reward center in [boy] brain [is] less easily activated and [isn't] sensitive enough to feel normal levels of stimulation. He [isn't] acting bored. He [is] bored, and he [can't] help it. [...] the teen boy brain needs to be more intensely scared or shocked to become activated even the tiniest bit. (37)

Researchers in Maine tested teens' perception of neutral faces by giving them a squirt of vasopressin nasal spray. They found that, under the influence of this hormone, the teen girls rated neutral faces as more friendly, but the boys rated the neutral faces as more unfriendly or even hostile. (38-39)

Some scientists believe human males have retained beards and facial hair, even in warmer climates, in order to make them look fierce and hide their true emotions. (39)

Liesbet Ruytjens and colleagues in the Netherlands compared the brain activity of seventeen- to twenty-five-year-old males and females as they processed the sound of white noise and as they processed the sound of music. The female brains intensely activated to both the white noise and to the music. The male brains, too, activated to the music, but they *deactivated* to the white noise. It was as if they didn't even hear it. The screening system in their male brains was automatically turning off white noise. Scientists have learned that during male fetal brain development, testosterone affects the formation of the auditory system and the connections within the brain, making it inhibit unwanted "noise" and repetitious acoustic stimuli more than the female brain

does. (40-41)

Everything about a teen boy says he couldn't care less about what other people think of him or how he looks. But in reality, just the opposite is true. (42)

A teen's self-confidence is directly proportional to how he looks in front of his peers. If he can't be on top, the next best thing is pretending not to care. (43)

Studies show that winning releases more testosterone than losing, even in sports spectators. Winning is a natural high that acts in the brain a lot like drug addiction because it's such a huge rush. (45)

[...] teens have two distinct systems running their brains.

The activating system – led by the amygdala – develops first. It is impulsive and gets double the stimulation when he's with his peers. It's like a gas pedal. It accelerates. The second system, the inhibiting system – the prefrontal cortex (PFC) – is like a brake. It carefully thinks things through, weighs the risks, and when working smoothly, it stops us from doing things that are dangerous and stupid. [...] the inhibiting system doesn't mature in boys until their early twenties. (47-48)

Researchers have shown that teen boys begin to be repulsed, not only by the proximity of their mother's body, but also by her smell. The scientists speculated that this may have evolved as a protection against inbreeding. (48)

Girls don't fully appreciate the bravery it takes for a guy to risk rejection by asking them out. (49)

CHAPTER THREE

THE MATING BRAIN: LOVE AND LUST

Researchers have found that the attraction to an hourglass figure – large breasts, small waist, flat stomach, and full hips – is ingrained in men across all cultures. This shape tells his brain she's young, healthy, and probably not pregnant with another man's child. (52)

In a study of an African hunter-gatherer tribe called the Hadza, men rated women with deeper voices as better foragers, but said they were more sexually attracted to the women with the highest-pitched voices. And the women in the tribe rated the men with the deepest voices as the best hunters and protectors, but were turned off by the men with squeaky or high-pitched voices. (55)

[...] a study in Switzerland of sweaty T-shirts that had absorbed the pheromones of the people who wore them showed that those who were good genetic matches (that is, those who were most dissimilar) smelled best to each other. (55)

In the mating game, a kiss is more than a kiss – it's a taste test. Saliva contains molecules from all the glands and organs in the body, so a French kiss serves up our signature flavor. (56)

Scientists have learned that there is plenty of bioactive testosterone in men's saliva, enough that it may activate the sexual-arousal center in a woman's brain. (56)

One of the most colorful examples of animal tactics is provided by the side-blotched lizard (*Uta stansburiana*). Conveniently, the males come with three different colored throats that match their mating styles. Males with orange throats use the alpha-male harem strategy. They guard a group of females and mate with all of them. The males with yellow throats are called sneakers because they slip into the harem of the orange throat and mate with his females whenever they can get away with it. The males with brilliant blue throats – my personal favorites – use the one-and-only strategy. They mate with one female and guard her 24/7. From a biological perspective, the approaches of the orange-throated harem leader, the yellow-throated sneaker, and the blue-throated one-female type are all successful mating strategies for lizards and for human males, too. (59)

Scientists have found that male prairie voles are monogamous and share equally in parenting their offspring. But their cousins – the montane voles – are strictly promiscuous, seek sexual variety, and specialize in one-night stands that last less than a minute. The difference between the mating strategies of these vole cousins originates in the brain. When the prairie vole finds his partner, he mates with her over and over in a twenty-four-hour sexual marathon. This sexual activity changes his brain forever. An area of brain called the AH – the anterior hypothalamus – memorizes his partner's smell and touch, leading him to aggressively reject all other females. This blissful day in the new vole couple's relationship is not only unforgettable, but biologically necessary. Memorizing her and thus merging the so-called love and lust circuits in his brain will initiate a lifelong preference for this one female.

During sex, both prairie and montane voles release vasopressin and dopamine, but only the prairie vole has the type of vasopressin receptors in his brain needed to make him monogamous. And when scientists experimentally blocked these monogamy-inducing vasopressin receptors in the prairie voles' brains, they didn't bond with their sexual partners. The love and lust circuits in their brains couldn't merge. What makes vole brain and the montane brain is their differing genes. The monogamous vole's vasopressin receptor gene is a longer version, and the promiscuous vole's is a shorter version. When scientists inserted the long version of the gene into the promiscuous montane vole, he too, became monogamous. (59-60)

If we could travel along [man's] brain circuits on a miniature train as he was falling in love, we'd begin in an area deep at the center of his brain called the VTA, the ventral tegmental area. We'd see the cells in this area rapidly manufacturing dopamine – the brain's feel-good neurotransmitter for motivation and reward. As the brain was being filled with dopamine at this VTA station, [man] was starting to feel a pleasant buzz.

Filled with dopamine, the train would speed along his brain circuits to the next station the NAc, or nucleus accumbens, the area for anticipation of pleasure and reward. [In a] male, we'd see the dopamine from the train being mixed with testosterone and vasopressin. If you're female, it gets mixed with estrogen and oxytocin. Mixing dopamine with these other hormones was now making an addictive, high-octane fuel, leaving [a man] exhilarated and head over heels in love. [...] As the train sped into the final station, the caudate nucleus, or CN, the area for memorizing the look and identity of whoever is giving you pleasure, we'd see all the tiniest details about [a woman] being indelibly chiseled into his permanent memory. She was now literally unforgettable. Once the love

train had made these three stops at the VTA, the NAc and the CN, we'd see [man's] lust and love circuits merge as they focused only on [the woman]. (62-63)

CHAPTER FOUR

THE BRAIN BELOW THE BELT

[...] men want an average of fourteen sexual partners in their lifetime, while the women said they wanted an average of one or two. (67)

[...] it [takes] only five minutes of casually interacting with attractive women for men's testosterone levels to go up. (68)

[...] it takes the male brain only one fifth of a second to classify a woman as sexually hot- or not. This verdict is made *long before* a man's conscious thought processes can even engage. And often it's the brain below his belt that knows first. (68)

Even though most men say they wish they had a larger penis, 85 percent of women say they're happy with their partner's size. Women report being most turned on by other physical features, like his eyes, smile, jawline, and muscles. And when it comes to being selected as a long-term partner, studies show that men get more mileage out of improving their personality and their bank accounts than out of investing in penile enlargement. (69)

All men know that the penis has a will of its own and can rise to attention without a single command from his brain. These reflexive erections are different from true sexual arousal because they come from unconscious signals from his spinal cord and brain, not from a conscious desire to have sex. The testosterone receptors that live on the nerve cells in a man's spinal cord, testicles, penis, and brain are what activate his entire sexual network. (69-70)

[...] prior to their forties, seeing is often all it takes for most men to become fully erect. After that age, the frequency of the instant hard-on is reduced, and men often need some physical stimulation to become erect enough for penetration. (70)

Sex researchers believe that men enjoy [oral sex] for many reasons, but one of the biggest is heightened sensitivity: the tongue, lips, and fingers can stimulate and stretch a man's urethral opening, increasing sensitivity in a way that doesn't happen as much inside the vagina. Researchers at McGill University found that as a man becomes more and more sexually aroused, the tip area, the glands of his penis, becomes less and less sensitive. This may be Mother Nature's way of protecting a man from pain during sexual intercourse. So, if there are times when a man can't reach climax during intercourse, he often *can* orgasm with the extra stimulation of oral sex. (72)

Researchers have studied men and women in a PET scanner while their partners were manually stimulating their penis or clitoris to orgasm. Although differences showed up between men and women while they were being stimulated, there were few, if any, discernible brain differences during orgasm itself. (73)

Until men learn to inhibit the sex-arousal centers in their brains, the tail wags the dog,

and they often reach orgasm long before their female partners have a chance. For reasons scientists don't completely understand, it typically takes women seven to eighteen minutes of vaginal intercourse to climax [...]. Scientists have discovered a group of neurons in the spinal cord called spinal ejaculatory generators that can be turned on or off by the brain. To gain dominion over the brain below his belt, a man must learn to direct his focus from his brain's sex centers to a nonsexual area. Tricks men may use to accomplish this include mentally solving complicated math problems, silently reciting the alphabet backward, or activating the disgust center, the insula, by thinking of something revolting. But when his penis is being pumped up with ten times the normal amount of blood, trying to stop an orgasm can be like trying to stop a runaway train. Perhaps that's why up to 40 percent of young men climax in fewer than eight to fifteen penile thrusts. According to researchers, more experienced men [...] can teach themselves to last for seven to thirteen minutes or more. (73-74)

[...] the hormone oxytocin is to blame for a man's so-called postcoital narcolepsy. Oxytocin promotes pleasurable, warm, safe feelings during and after sex for both men and women. In the female brain, the oxytocin and dopamine released after orgasm make her want to cuddle and talk. But research shows that this postorgasmic blast in men may lull them to sleep as it's released into their hypothalamus, triggering the brain's sleep center. (77)

CHAPTER FOUR

THE DADDY BRAIN

Some men are over the moon about their wife's pregnancies, but studies show that feelings of distress peak for most men four to six weeks after they discover they're going to be fathers. They seldom reveal these worries to their mates. (79)

[...] two major hormone change in fathers-to-be: testosterone goes down and prolactin goes up. Scientists believe that men may be responding to the natural airborne chemicals of pregnancy – pheromones – emanating from the mother-to-be's skin and sweat glands. (80)

[...] the experience of being a hands-on father dramatically increases the number of connections in the male brain for paternal behavior. (84)

Many fathers who don't have daily hands-on contact may fail to form the strong daddy brain circuits required for parent-child synchrony. (85)

Researchers at Ohio State University found evidence that fathers' beliefs about how involved they should be in child care didn't matter; it was mothers who were in the driver's seat. They discovered that moms are the gatekeepers for fathers' access to their children. Mothers can be very encouraging to fathers and open the gate to their involvement, or they can be critical and close the gate. (87)

The researchers found that daddy play is more creative and unpredictable and thus more stimulating (88)

[...] scientists followed a group of children for fifteen years. They first began observing

the fathers interacting with their children at two years of age. They found that the children whose fathers played roughly with them [...] were the most self-confident by the time they reached adolescence. (89)

Dads employ teasing with sons and daughters, but their daughters usually don't like it as much as their sons. Daughters will soon try to divert Dad and assign him a part in the role-playing games girls prefer. (And most dads are usually willing to go along with whatever roles their little girls give them.) Boys, on the other hand, love the teasing games and will actively egg Dad on, trying almost anything to get his goat. (89)

[...] even though some modern parenting styles endorse the laid-back father as more likely to be a good dad than the high-testosterone macho man, biological research suggests that the opposite may be true. (91)

Research [...] shows that when a little girl has a close relationship with her dad, it sets the stage for getting along better with men later in life. (92)

A study in Wisconsin reported that fathers feel closest to their daughters when they are doing something to help them. This holds true whether the daughter is four or forty-four. Dads bond with their daughters by helping to solve their problems and fixing things that are broken, whether it's their dollies or their financial portfolios. Fathers also bond with their sons by helping them, but research shows that this "help" often centers on making the boys stronger and tougher. Studies show that dads feel it's their responsibility to toughen their sons up to be able to survive as a man in the real world. This sometimes leads them to inhibit displays of affection in favor of rougher handling. (92-93)

CHAPTER SIX

MANHOOD: THE EMOTIONAL LIVES OF MEN

Research has suggested that our brains have two emotional systems that work simultaneously: the mirror-neuron system or MNS, and the temporal-parietal junction system, or TPJ. Males seem to use one system more, and females seem to use the other system more.

If we could scan [man's] brain as [his female mate] complained about her problems and started to cry, we'd see both of his systems for reading emotions switching on. First, his MNS would activate. The mirror neurons that make up his MNS would allow him to briefly feel the same emotional pain he was seeing on [female's] face. This is called emotional empathy. Next, we'd see his brain's analyze-and-fix-it circuits being activated by the TPJ as it searched his entire brain for solutions. This is called cognitive empathy. The male brain is able to use the TPJ starting in late childhood, but after puberty a male's reproductive hormones may cement a preference for it. Researchers have found that the TPJ keeps a firm boundary between emotions of the "self" and the "other." This prevents men's thought processes from being *infected* by other people's emotions, which strengthens their ability to cognitively and analytically find a solution. (97)

I once asked my scientist husband, "Why do men respond to emotional issues with logic instead of feelings?" He laughed and said, "The real question is why women don't." (100)

A man's brain area for suppressing anger, the septum, is smaller than it is in the female brain, so expressing anger is more common response for men than it is for women. The anger-aggression circuits in the male brain are formed before he's born and get behaviorally reinforced during boyhood and hormonally reinforced during the teen years. And by adulthood, using these hormonally influenced circuits for social risk-taking and aggression have become a familiar part of his life. Men in their forties [...] still have a lot of testosterone and vasopressin fueling their brain circuits, often giving them a hair trigger for anger. Studies have found that though men and women report that they *feel* anger for an equal number of minutes per day, men get physically aggressive twenty times more often than women do. (102)

Once some men's anger ignites, it's hard to stop. Their anger gets fueled by testosterone, vasopressin, and cortisol. These hormones reduce a man's physical fear of the opponent and activate his territorial fight reaction. [...] Scientists have found that when anger reaches the boiling point in some men, under conditions of high testosterone, it can produce pleasure, egging them on and making their anger harder to control. (105)

Like human males, chimps will bluff, scheme, and even murder to gain or maintain rank. And like human males, they respond biologically to victories and setbacks. The testosterone that runs their competitive circuits ramps up as they anticipate a confrontation. (110)

CHAPTER SEVEN

THE MATURE MALE BRAIN

Men in their fifties and sixties [...] are beginning to make less testosterone and vasopressin, and researchers have shown that the ratio of estrogen to testosterone increases as men get older. Hormonally the mature male brain is becoming more like the mature female brain. Some scientists believe that with a different balance of fuels running a man's brain, he may become more responsive to his oxytocin, the cuddling and bonding hormone. (113)

In fact, the ability of older men to reproduce with younger women, called the "late-life male fertility factor," may be partly responsible for our species' long lifespan. Scientists at Stanford University found that this factor explains why humans live so long, even though, in theory, a female has outlived her evolutionary purpose by midlife when she is no longer fertile. Because men and women share most of the same gene pool, they both potentially benefit from any longevity genes in the other sex. Scientists argue that it's these late-life fertility genes that women share with men that explain women's longer lives. (117)

When men live alone and become isolated – which they do more often than women – their daily routines can become repetitive habits that get deeply engraved into their brain circuits. Soon, if someone disrupts their routine, they get irritated because their brain's social-flexibility circuits are weakened from disuse. This is the story of grumpy old men. (119)

[...] aside from inheriting good genes, a man's best chance for longevity is to sleep

deeply, stay strong, avoid tobacco, and get married and stay married. For unknown reasons, married men live 1.7 years longer than single men. But [...] "Those extra years better be damned good!" (120)

[...] giving testosterone to men with abnormally low levels improved the men's physical and mental health. They found that it revived libido and penile function too. In addition, the men in the study had better muscle elasticity and bone density. They also reported improvements in their mood and their cognitive ability. And as a bonus [...] increasing testosterone can kick-start abdominal weight loss. (124)

[...] drugs like Viagra can increase the release of oxytocin in the brains of rats by as much as threefold. Perhaps the famous blue pills will someday be used to promote deeper emotional intimacy and not just better erections. (126)

According to scientists, older people don't let bad news or criticism get to them as much as younger people do. In a study comparing how the brains of seventy-year-olds versus twenty-seven-year-olds handle negative emotions, the older adults performed better. In particular, the researchers found that the brains of older adults had developed greater connectivity between the PFC, the area for regulation of emotions, and the amygdala, the area for driving emotional impulses. They concluded that the mature brain was not only better at controlling negative emotions but better at letting go of them. (127)

[...] in later years [men] change their focus from activities that [give] them a personal advantage toward activities that would give their community and the next generation an advantage. (129)

APPENDIX

THE MALE BRAIN AND SEXUAL ORIENTATION

[...] a part of the hypothalamus called the suprachiasmatic nucleus (SCN) is twice as large in gay males as in straight males. This difference was later shown to be caused by a difference in the way testosterone reacts with the developing brain. [...] the anterior commissure – a bundle of superfast cables that connects the brain's two hemispheres – is larger in gay males than in straight males. This structure, which is also larger in women than in men, is believed to be involved in sex differences related to cognitive abilities and language, and fits with the finding that gay males, like females, have better verbal abilities than straight males. (133-134)

[...] an anatomical asymmetry in the size of the two brain hemispheres that is characteristic of straight male brains is not observed in gay male brains. Instead, their magnetic resonance imaging studies showed that in this respect gay male brains were more like female brains. With PET scans, the researchers also found that the connectivity of the amygdala of the gay male brain is more like that of the straight female brain than of the straight male brain. These studies suggest that there are differences between gay and straight male brain areas that are not directly involved in sexual attraction. (134)

[...] identical twin pairs, who have all the same genes, are more likely to share sexual orientation than fraternal twin pairs, who share only half of their genes. [...] about 35 percent of sexual orientation is attributable to genetic influences, whereas the rest is due

to as yet unidentified factors. (135)

NOTES

INTRODUCTION: WHAT MAKES A MAN

[...] testosterone sets the male brain up for faster visuomotor scanning, faster physical reflexes, and more risky behavior.

ONE: THE BOY BRAIN

Normal development of the male brain involves two distinct processes, masculinization and defeminization. They occur during critical periods of brain sexual differentiation. Masculinization allows the expression of male sex behavior in adulthood, and defeminization eliminates or suppresses the expression of female sex behavior in adulthood. Once inside the fetal brain, much of the testosterone is actually converted by the enzyme aromatase into estrogen. Ironically, then, it is the estrogen that helps masculinize and defeminize the male brain working in concert with MIS.

TWO: THE TEEN BOY BRAIN

Brain regions that underlie attention, reward evaluation, emotional discrimination, inhibition of impulses, and goal-directed behavior undergo architectural remodeling throughout puberty and into early adulthood.

During puberty the non-erect penis doubles in length. In boys, the fastest growth spurt in height occurs three years after puberty onset.

Testosterone not only saves cells from being killed off in the male spinal cord and brain's visual cortex; it primes the visual cortex to focus on sexually attractive females. Some men recall when their brain's visual perception changed at puberty and, almost overnight, all it took as the *hint* of a female shape to snap their heads around. In females, two out of three of these special sex cells in the spinal cord die due to lack of testosterone. [...] In gay male teens the brain begins responding to visual cues from same-sex faces, body parts, and pheromones of other males.

[...] the total cerebral volume peaks at age 10.5 in females and 14.5 in males.

[...] 95 percent of men and 71 percent of women masturbated. And one consistency across all studies was the large gender difference in the prevalence and frequency of masturbation – both being much greater in males.

THREE: THE MATING BRAIN: LOVE AND LUST

[...] man's testosterone goes up from just talking to a woman.

[...] kissing is a mate-assessment device. [...] testosterone and its metabolites are found in male saliva, semen, and sweat – and they smell, and perhaps taste, delicious to a woman when she is ovulating. While females find the masculine odor attractive, heterosexual males dislike it.

[There is] a sex difference in detecting infidelity – men are better at it. [...] 20 percent to 25 percent of the married American population had had episodes of infidelity. [...] in Finland, 52 percent of the men and 29 percent of the women reported episodes of

infidelity in their lifetimes. They found that men reported being less emotionally involved than women with their infidelity partners, whereas the women seemed to connect both emotionally and sexually.

[...] sex increases the desire to share personal information, fosters intimacy-related thoughts, and promotes a willingness to sacrifice for one's partner. [...] although sexual activity and sexual satisfaction decline in women and men as the duration of the partnership increases, sexual desire declines only in women, not in men. (And the desire for tenderness declines in men and rises in women.) They conclude that a stable pair bonding does not require high levels of sexual desire for women, after an initial phase of infatuation has passed. But for men the opposite is true. They found that the male sexual desire should stay at a high level because it was selected for in evolutionary history as a precaution against the risk of sperm competition.

[...] when a man [is] described as "unattached," 59 percent of the single women were interested in pursuing him, but when the same man [is] described as "being in a committed relationship," over 90 percent of the women expressed interest in the guy.

FOUR: THE BRAIN BELOW THE BELT

[...] oxytocin is released in the male brain, during and after sex, for up to four hours, thus increasing sedation and relaxation and decreasing anxiety.

FIVE: THE DADDY BRAIN

[...] having no testosterone at all, due to castration, reduces paternal behaviors. Brain connections in castrated male mammals for paternal behavior became reduced due to fewer vasopressin cells in the brain.

SIX: MANHOOD: THE EMOTIONAL LIVES OF MEN

[...] men consciously (supraliminally) suppress emotions, but unconsciously, at first they react more to their emotions – as evidenced only by the microexpressions in their frowning or smiling muscles. [...] women consciously (supraliminally) exaggerate their emotions, but unconsciously, at first, they react less to their emotions.

SEVEN: THE MATURE MALE BRAIN

[...] men with lower testosterone are more motivated to cooperate with others.