



Figure 1 Relationships between some of the known neuroactive steroids. This group of steroids is synthesized from cholesterol. Smith *et al.*<sup>5</sup> have found that, in female rats, decreased production of allopregnanolone — due to decreasing levels of progesterone during menstruation — leads to increased production of the  $\alpha 4$  subunit of the  $\gamma$ -aminobutyric acid GABA<sub>A</sub> receptor. This changes the sensitivity of the GABA<sub>A</sub> receptor to endogenous ligands, resulting in symptoms associated with premenstrual syndrome, such as increased susceptibility to seizures and insensitivity to benzodiazepine drugs.

responsible seems to be the abrupt decline in progesterone and allopregnanolone, and that this leads to changes in production of a specific subunit of the GABA<sub>A</sub> receptor. The authors used indomethacin to block the formation of allopregnanolone in female rats that were exposed to progesterone. When they then withdrew the progesterone, they found that the rats did not show the insensitivity to benzodiazepine that is usually seen. They also observed an increase in levels of the  $\alpha 4$  subunit of the GABA<sub>A</sub> receptor, both *in vitro* and *in vivo*, following progesterone withdrawal. Moreover, when they treated rats with antisense oligonucleotides against the  $\alpha 4$  subunit (to prevent transcription of the protein), this also reversed the benzodiazepine insensitivity and increased susceptibility to seizures that are usually seen during progesterone withdrawal.

These results indicate that fluctuations in endogenous levels of progesterone — via its metabolite allopregnanolone — may result in changes in the sensitivity of GABA<sub>A</sub> receptors to endogenous ligands, resulting in an increased susceptibility to seizures and insensitivity to benzodiazepines. Because such fluctuations in neuroactive steroids occur in the menstrual cycle and in pregnancy<sup>3</sup>, they may be responsible for some of the symptoms observed. But Smith and colleagues' study represents only a part of an explosion of interest in modulation of brain function by neuroactive steroids. Many steroids have been identified that have the potential to act like neuroactive steroids, some related to corticosteroids and others to progesterone. Such steroids may be found in the brain, independent of circulating hormones<sup>6</sup>. Moreover, steroids such as pregnenolone sulphate and DHEA sulphate have been shown to modulate glutamate receptors<sup>15,16</sup>, and they may play a role in memory.

This neuroactive-steroid connection may

prove to be involved in sedative-hypnotic actions<sup>8</sup>, ageing<sup>17</sup>, stress<sup>18</sup> and alcohol abuse<sup>19</sup>. Perhaps more importantly, the steroids derived from progesterone may explain a variety of symptoms during pregnancy and the menstrual cycle, and, perhaps, some of the differences between men and women in the incidence of anxiety and mood disorders<sup>1</sup>. □

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Daedalus

The wide open society

Last week Daedalus unveiled his 'Lying Eye' video-analysis computer system, for telling if a speaker is lying. It decodes the body language of many small facial, bodily and verbal clues to spot the subtle signature of dishonesty, and gauges its magnitude. It will transform video conferences and law courts — and much else besides. For deceit and concealment are universal social skills. The human subconscious itself may have evolved as a safe place in which to hide the truth, freeing the conscious mind to deploy its own lies, and detect the lies of others. A machine that spots deception will transform society. Hysteria, that fashionable Victorian syndrome, vanished in this century through being 'rumbled'. Daedalus hopes that Lying Eye will similarly expose many current emotional fashions.

Its first target will be the indignation industry. Claims to be shocked or offended, accusations of insensitivity, harassment or abuse, gusts of conspicuous compassion towards socially approved underdogs, all will wither under the cool scrutiny of the Lying Eye video scanner. With any luck, a whole portfolio of self-righteous posturing and virtuous outrage will be thoroughly shown up. Even the keenest players will have to abandon the game.

But Lying Eye itself is only the prototype of a broader emotion-detector. It makes its deductions from a vast wealth of non-verbal data — a full spatial Fourier analysis of all face and body movements, correlated with audio output. Many other emotions must also be coded in these data: hostility, superiority, nervousness, anger, drunkenness or druggedness, sexual invitation or intent, criminality, and so on. An improved video analyser could detect them all. Daedalus is developing a wider and more detailed program, provisionally code-named 'Insight', for the job.

'Insight' will initially be aimed at psychiatry and counselling. Clients will be happy to have their basic problems and attitudes identified at once, and their progress under therapy accurately monitored. But Insight should also soon escape into wider society. It should expose trickery and game-playing of all kinds, and enforce far more authentic and healthy styles of social interaction. Ultimately, Insight will be fitted to every security camera. Social harmony will then reach its final peak. Big Brother will know the location, feelings and intentions of each of his loyal subjects all the time.

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