FACT SHEET ELEVEN

THE EFFECTS OF ALCOHOL ON THE BRAIN

Alcohol affects the higher centres of the brain first. By 'higher' is meant those centres of the brain which, in the evolutionary process, developed last and also, which develop last in the individual child. These tend to be the brain functions which are generally recognised to be the most sophisticated ones.

1 The front lobes

These are the last parts of the brain to be 'wired up' – and may not be fully operational until adolescence. They make up 20% of the human brain. These are the general managers of the brain. They co-ordinate plans and actions, are the seat of self-awareness, fore-thought and impulse-control.

2 The rest of the cerebral cortex (i.e. lower in the process of development)
This area of the brain is responsible for complex reasoning, calculation, language, memory and perception.

3 The area of the brain below the cerebrum
These are the older parts of the brain. They regulate the emotions, hunger, thirst, sex, some memory and perceptual functions.

4 Further down
These are the parts of the brain responsible for basic alertness, breathing, heart-rate, and the co-ordination of body movements.

Anxiety

Alcohol is a depressant drug; it acts to depress, or reduce the activity of the brain and the Central Nervous System. It depresses the most sophisticated functions first, but gradually starts to affect and shut down the activities of the lower centres of the brain, in the order in which they have been described. To illustrate this in more practical terms, the first brain area to be affected is that which controls anxiety. A certain amount of anxiety is beneficial to an organism; it stops people going too near the edge of a cliff, for example, or jumping into a raging torrent.

However, modern life can be very stressful and cause people to suffer extended periods of anxiety, so that in our culture, relief of stress is perceived to be desirable. Drinking alcohol temporarily reduces the amount of anxiety which the brain normally generates,

so the person does not feel as anxious as they normally would. This disinhibition is probably the main reason that most people drink: they find alcohol relaxing, and under its influence they are less worried about their social competence, or how they are going to pay the next gas bill. Occasional 'relief' drinking is probably not harmful in itself, but it can become problematic if it becomes the only or main way to gain relaxation or freedom from stress. Heavy or dependent drinkers may find that when they stop drinking, the 'stored-up' anxiety which had, for so long, been suppressed, comes rushing back in a sort of 're-bound' effect, and they may suffer extreme anxiety states, or even panic attacks. Some heavy drinkers develop a sort of agoraphobia, or more accurately a fear of being in crowds, or crowded places.

Judgement

The next function to be affected is judgement. This is a wide ranging and significant facility, incorporating issues such as 'how fast is that car going?', and 'is it safe to have unprotected sex with this person?' The impairment of judgement is compounded by the loss of anxiety and the risk-taking behaviour it can lead to.

Fine Motor Skills

The centres of the brain which enable the individual to perform delicate precision movements with their hands are next on the list for shutdown. It can be interesting to conduct an experiment with needle threading when sober and again after a couple of drinks.

Reasoning

This is not quite the same as judgement, as it implies a process of comparing and sifting evidence from two or more judgements and putting them together. An example would be 'it's a bitterly cold night and I can only swim a few yards, is it a good idea to accept my friend's challenge to beat him in a competition to swim out to sea as far as the end of the pier'. Again, the effect of the loss of anxiety compounds sound reasoning.

Speech

Speech is a relatively sophisticated but significant function, and its impairment is very noticeable. By the time the person's speech is becoming slurred, it is obvious that they are disinhibited and more prone to risk-taking, they are lacking in judgement and the ability to reason properly.

Co-ordination

Less sophisticated, but still important is the ability to co-ordinate bodily movements. Again, when the person is unable to stand upright or to walk in a straight line, you can be sure that the higher functions are impaired too.

Autonomic Functions

These are the most basic of the brain's functions. These are the activities which a person is normally totally unaware of; for example breathing, and reflexes which occur in particular situations. If a person drinks enough alcohol, it is possible for them just to stop breathing. Quite commonly, a person's stomach lining is irritated by alcohol to the extent that they vomit. In normal circumstances a person who has an irritating substance in their throat has a 'choking' response, which ejects the substance out of the body. In someone who has had a lot to drink, the 'choking' response may fail to operate, and the vomit lodges in the throat, suppressing the breathing function, which is already impaired.

Other immediate effects

Under the influence of alcohol, there is a tendency for attention to be focussed very much on the 'here and now'. Tomorrow's consequences of today's actions are not considered. Also, there is a tendency for peripheral stimuli in the environment not to be noticed or processed. Attention is trained on what is immediately in front of the person. This can be particularly dangerous for the hapless cyclist riding on the inside of a drunk driver. Accompanying the loss of judgement and reasoning there is often a degree of paranoia. A typical presentation of this occurs amongst men in pubs and is expressed in such confrontations as 'Are you looking at my woman?!', or 'Are you calling me a XXX?' typically, the person feels that their honour is impugned in some way. Also, environmental cues are misinterpreted, tones of voice, inferences and intentions may be misjudged.

Longer-lasting consequences

Alcohol is not good for the brain. It deprives it of oxygen, impairs intelligence and affects the memory. Alcohol destroys vitamin B in the body, and vitamin B is essential for the brain's proper functioning. A heavy drinking bout can damage as many as 100,000 brain cells. Loss of short-term memory is very common and is frequently regarded as a joke. 'It must have been a good night last night, I don't know how I got home'. Constant or repeated binge drinking can lead to a permanent and incapacitating loss of short-term memory and a confused state known as Wenicke's Encephalopathy which if left untreated can lead to Korsakoff's Syndrome. Heavy drinking can also lead a person to be permanently prone to have anxiety or panic attacks. Some dependent drinkers suffer from epileptic type fits when they stop drinking, and in some, these fits become a permanent feature of their health profile. Heavy alcohol use can lead to permanent psychosis, or temporary symptoms of it, such as visual or auditory

hallucinations. In a patient with a pre-existing mental illness, use of alcohol can exacerbate symptoms, adversely affect medication or interfere with diagnosis.

Depression

Many researchers believe that alcohol is the major cause of depression in the UK. It is a depressant drug in all senses of the word and long-term use can adversely affect mood. Often heavy drinkers approach their GPs complaining of symptoms they experience such as mood swings, anxiety and depression, and fail to mention the fact that they are consuming large amounts of alcohol. Hard-pressed doctors prescribe anti-depressant medication, which means that the patient is now taking 'uppers' and 'downers' at the same time. the Department of Health (1993) reported that 65% of suicide attempts are linked with excessive drinking.

The Brain's Balancing Act

The whole of the central nervous system has evolved to exist in very fine balance: on the one hand, it must be sufficiently alert to respond to unexpected danger (woolly mammoths, sabre-toothed tigers and the like); on the other hand, calm enough to allow the body to sleep at night. As a depressant drug, alcohol interferes with this balancing act. Large quantities of alcohol temporarily depress the nervous system, and repeated ingestion causes the body to fight back, by increasing the 'background level' of alertness. Taking alcohol to help you sleep, for example, will work to start with, as it depresses the nervous system. However, the body's response – increasing nervous system activity – may cause the drinker to awake in the early hours and find it difficult to get back to sleep. If the body gets accustomed to the presence of alcohol, the drinker may find that without alcohol they become anxious, irritable and shaky. These are all signs of increased nervous system activity; they are also symptoms associated with alcohol withdrawal. Drinking more will relieve the symptoms in the short term, by depressing the nervous system – but will only serve to make the problem worse in the future.