Biochemical factors

The interest in the effects of biochemical factors grew and their significance to the personality began to be studied. Eventually interest turned towards the effects of hormonal imbalance on criminal activity but researchers have found it difficult to discover any causal link between hormonal activity and criminality or other behaviour because hormones have only an indirect effect on behaviour

testosterone

Testosterone has been popularly related to the most aggressive and antisocial crimes such as rape and murder. The claim is that the male sex hormone, plasma testosterone, adversely affects the central nervous system causing aggressive behaviour

Olwens' study

Dan Olwens first found a clear connection between testosterone and both verbal and physical aggression. He then noticed a distinction between provoked and unprovoked aggressive behaviour. Provoked aggressive behaviour, which tended to be verbal more often than physical, was a response to unfair or threatening behaviour by another; any other aggression would be unprovoked. His research suggested that provoked violence was directly associated with levels of testosterone

Shelling's study

Daisy Shalling discovered that high testosterone levels in young males were associated with verbal aggression but not with actual physical aggression or fighting. This, she said, portrayed a desire, on behalf of the high testosterone boys, to protect their status by threats. The low testosterone level boys would tend not to protect their position, preferring to avoid conflict and remain silent

Neither study suggests that there is a direct link between aggression and testosterone, but simply that if the correct social circumstances arise, especially a provocative situation, then those with an ability to secrete high levels of testosterone are most likely to resort to violence or aggression.

Ellis and Coontz claim that testosterone is linked with sexual crime. Sexual assaults by males, particularly rape tend to be committed by men at an age when their sex hormones are very strong.

Despite these findings there is no evidence that there is any causal relationship between the behaviour and the level of testosterone.

The assumption of such a link was, however, used in the Twentieth Century to justify legalised castration for sex offenders. The policy was tried in such Countries as Denmark, Germany, Norway, Estonia and Sweden (among others). Thousands of such operations were conducted, but it was never proved that such methods would reduce levels of sexual aggression

Neurotransmitters

Substances such as serotonin, dopamine and norepinephrine all transmit signals between neurons in the brain. In animal studies, each of these substances has been linked to violent or aggressive behaviour. These show serotonin to be an inhibitor of aggression so low levels of serotonin have been linked to violence and suicide in humans. Dopamine and norepinephrine are thought to encourage aggression so that high levels do induce violence. These substances may be produced by aggression rather than cause it, so here again there is a serious problem associated with the nature of the link

The main problem is that it is impossible to tell whether environment, food and social factors most affect the levels of these substances or whether genetics is the factor. It is also not possible to say whether the mood causes the production of the neurotransmitters or whether the neurotransmitters cause the mood

Blood sugar

It has frequently been suggested that blood sugar levels are connected with antisocial and criminal behaviour. The most common claim in this area is that there is a connection between hypoglycaemia (a deficiency of glucose in the bloodstream) and criminality. The main symptoms of hypoglycaemia are emotional instability, nervousness, mental confusion, general physical weakness, delirium and violence. In severe cases, the individual may also be prone to automatic behaviour and to retrograde amnesia. Although not all these symptoms are evident in any one case or at any one time, they encourage claims that hypoglycaemia affects criminality.

Hypoglycaemia is often linked with alcohol, and if alcohol is imbibed regularly and in large quantities, the ethanol can induce hypoglycaemia and increase aggression. In many studies, habitual violence and alcohol are linked

Vitamins and minerals

It is claimed that either deficiencies of certain vitamins or the toxic effects of an excess of certain minerals is the cause of criminality.

Lead – the connections between lead levels and criminality has only recently been suggested. High levels of lead have also been linked to low levels of independence, persistence and concentration, and high levels of impulsiveness, daydreaming and frustration. The problems caused by high levels of lead may be compounded by a deficiency of vitamin C

Cobalt (which occurs in vitamin B_{12}). Two studies suggest a link between cobalt and violent behaviour. Each of them found that the lower the level of cobalt, the more violent was the behaviour pattern. Although these studies each claim a close relationship between cobalt and violence, neither explains the role of cobalt in a human body or how its level could be related to violent behaviour.

– A deficiency of the vitamin B complex is common amongst both criminals and hyperactive children. A shortage of vitamin B_1 can give rise to aggression, hostility, sensitivity to criticism and irrational behaviour, all of which are common in many delinquents. Those deficient in B_3 may, it is claimed, become fearful and act immorally because they are less able to discern right from wrong. Presumibly, due to the link with cobalt, B_{12} must also be connected with criminality