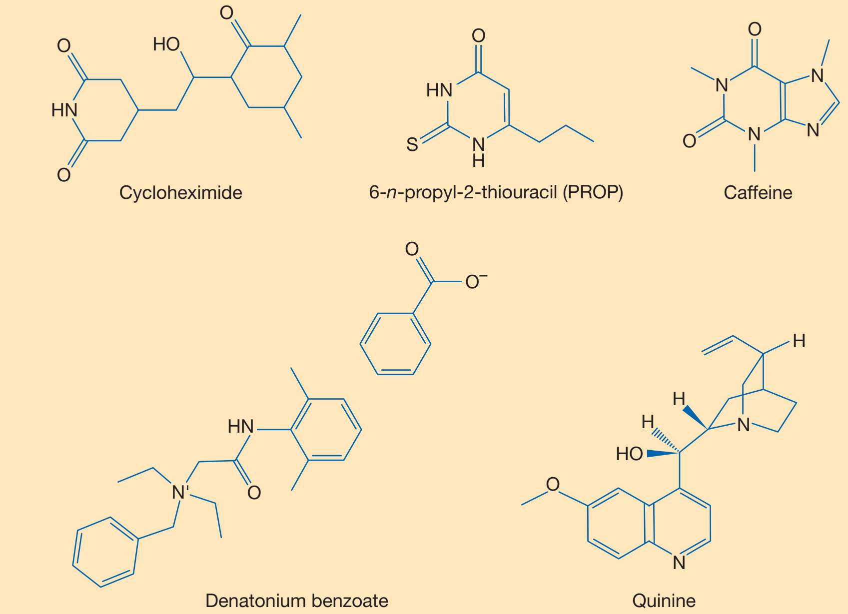

Figure 1 **Leaving a bitter taste in the mouth. The chemical structures of even these few bitter substances are very diverse. This leads one to suspect that there must be a family of bitter-taste receptors in the tongue — a family that has now been identified by Matsunami *et al.*[1], Adler *et al.*[2] and Chandrashekar *et al.*[3].**

will be sensitive to many bitter compounds, but the brain will not be able to distinguish which particular bitter substance is being detected. Indeed, humans often cannot distinguish between bitter stimuli. Bitter substances are frequently poisonous or harmful and need to be detected at low concentrations, before a fatal amount of something is swallowed. But because bitter substances include many different types of chemical (Fig. 1), a single receptor that recognized many bitter compounds could not be very sensitive to any one of them. The strategy of expressing multiple receptors, each recognizing a specific bitter taste, results in TRCs with a broad range but high sensitivity.

Victor Hugo once claimed that nothing is as powerful as an idea whose time has come, and this certainly seems to be true of taste receptors. Just a few weeks ago came the report[4] of a new family of receptors in the fruitfly *Drosophila melanogaster* that were distinct from the fly odour receptors but were also found in chemosensory organs. These new receptors seem to be the fly taste receptors, another distinct family of GPCRs. Finally, there is the curious taste umami — the taste of glutamate. We have glutamate receptors in the brain, for glutamate is an important neurotransmitter. But glutamate activates the brain glutamate receptors, called mGluRs, at concentrations that are far below taste thresholds. Chaudhari *et al.*[5] reported recently that an alternatively spliced isoform of mGluR4, with a more appropriate affinity for glutamate, is expressed in a subset of TRCs, so this may be the umami detector.

The taste field has had quite a start to the millennium. Where do we go from here? Taste is important in many areas of our lives. Caloric intake and salt ingestion are two obvious areas that might benefit from an understanding of the underlying taste mechanisms. Many medicines have a terribly bitter taste — so much so that patient compliance is often compromised. The development of bitter antagonists is now within reach, allowing us to increase the palatability of medicines and even of foods that are 'good' for you. Insect pests identify feeding and breeding plant hosts by taste, raising the possibility of controlling such pests by tastes rather than by toxic and environmentally harmful insecticides. Of course these developments are not trivial, and nor are the remaining questions — the identity of the sweet receptor, for example. But with the receptors that we now have and the application of a similar strategy to the newly available genome data, it should be well within our power to lick these problems. ■

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100 YEARS AGO

The question as to the origin of the energy possessed by the Becquerel rays is one of considerable interest. The existence of substances capable of emitting radiations possessing energy, without any appreciable loss of weight or introduction of work from external sources, would appear to be impossible from the view of conservation of energy. The measurements of M. Henri Becquerel upon the deviation of the radium rays in an electric field, taken in conjunction with those of M. and Mme. Curie of the charges carried by these rays, lead to results which show a way out of the difficulty, on account of the extreme minuteness of the quantities of energy in question. The calculations of M. Becquerel show that this energy is of the order of one ten-millionth of a watt per second. Hence a loss of weight of about a milligram in a thousand million years would suffice to account for the observed effects, assuming the energy of the radium to be derived from an actual loss of material.

From *Nature* 5 April 1900.

50 YEARS AGO

Preliminary trials during the past two years, which aimed at replacing costly cultivations in root crops by chemical methods of weed control, have now been completed at Jealott's Hill. *iso*-Propylphenylcarbamate, 'Methoxone' and 2,4-dichlorophenoxyacetic acid were known to prevent the germination of certain plant species when applied as pre-emergence dressings, and the species response to *iso*-propylphenylcarbamate was different from that of the other two compounds. Therefore, mixtures of *iso*-propylphenylcarbamate with 'Methoxone' and 2,4-dichlorophenoxyacetic acid were examined alongside pre-emergence dressings of the individual components. The applications were made at different intervals prior to sowing, and these were followed by observations on subsequent crop-growth and weed-control. The main experiments were on kale and mangolds; but lettuce, onions, field beans, peas, lucerne, sugar beet and swedes were included in the second year. The preliminary trials are being extended to cover a range of soil and climatic conditions; but, although the conclusions are only tentative, they point to new possibilities of weed control in crops where at present few chemical methods are available.

From *Nature* 8 April 1950.