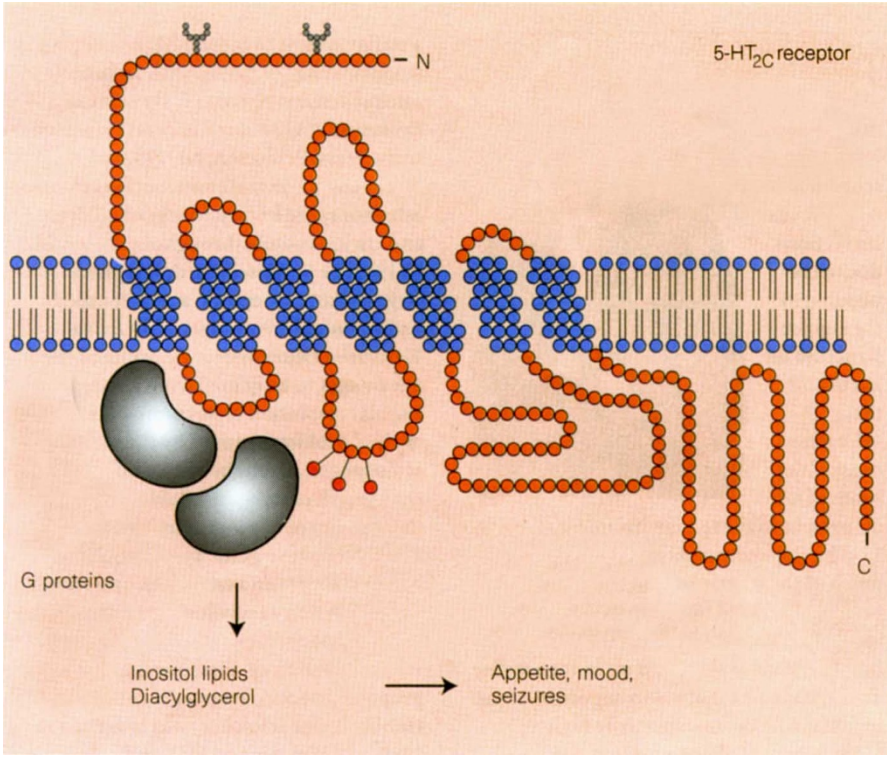

Figure 2 **The amino-acid residues that are changed by RNA editing are confined to the second intracellular loop of the 5-HT_{2C} receptor. Edited receptors show decreased guanine-nucleotide-binding (G) protein coupling, which leads to a reduction in signalling by inositol lipids and diacylglycerol. Studies with 5-HT_{2C}-receptor knockout mice indicate that, in humans, this could result in decreased appetite, mood changes, and increased neuronal excitability which could lead to seizures. (Adapted from ref. 9.)**

receptors to guanine-nucleotide-binding (G) proteins (Fig. 2). Receptors that are encoded by the fully edited transcript show a 10–15-fold reduction in G protein–receptor coupling, leading to decreased activation of phospholipase C (an enzyme that hydrolyses membrane phospholipids to activate the inositol phosphate and diacylglycerol signalling pathways). Transcripts that are not completely edited encode receptors that behave in the same way as unedited 5-HT_{2C}.

The 5-HT_{2C} receptors are widely expressed throughout the central nervous system, including the cortex, striatum, hypothalamus, olfactory bulb and choroid plexus. Regional differences in RNA editing are apparent. The most abundant edited variant found in most regions of the brain that were sampled by Burns *et al.* would not be predicted to be any less responsive to 5-HT than the unedited protein. Nevertheless, differential editing does suggest a new mechanism for the regulation of 5-HT-mediated signal transduction.

It is also interesting that mice in which the 5-HT_{2C} receptors have been inactivated by homologous recombination have an eating disorder and are overweight. Moreover, agonists of the 5-HT_{2C} receptors no longer act as appetite suppressants in these mice[8]. Intriguingly, drugs such as fluoxetine (Prozac) and dexfenfluramine, which increase nervous transmission by blocking re-uptake of 5-HT, control the overeating that is associated with certain obesity syndromes, and act as antidepressants: these drugs most probably act through 5-HT_{2C} receptors. 5-HT_{2C}-receptor knockout mice die from epileptic seizures, and this can be mimicked in wild-type animals with non-selective 5-HT_{2C}-receptor antagonists. So the epilepsy is probably not due to abnormal brain development, but to the absence of a normal function of the 5-HT_{2C} receptor in mediating tonic inhibition of neuronal excitability. Perhaps RNA editing is involved in the control of higher cerebral functions such as appetite, mood and consciousness, or in diseases such as depression and epilepsy. And maybe RNA editing will now become a target for the pharmaceutical industry. □

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Daedalus

Reduced mass

Masonry is one of the earliest and most brilliant of inventions. Merely by piling rocks or bricks on top of one another, you can assemble a structure as basic as a hut or as complicated as a cathedral. All the joints are safely in compression, and are kept stable by simple friction. (The mortar between the stones is not an adhesive, but a load-spreader. With careful enough design, you can do without it, as proved by Egyptian pyramids and English dry stone walls.) There are two disadvantages. The whole thing is extremely heavy; and it can get very cold and damp in winter. Daedalus is now tackling both problems.

He points out that bricks and many stones are porous. This is not dangerous; to be stable, a masonry structure needs wall and pillars of such a large cross-section that the crushing loads on the bricks are extremely low. So he is taking this porosity to extremes. DREADCO ceramicists are inventing a light, foamed brick with little strength but equally little weight. They are mixing brick clay with a 'baking powder' whose grains give off carbon dioxide when heated to firing temperature. Cunningly, the powder is made of grains with a carefully adjusted set of sizes. The biggest grains blow enough bubbles to make a close-packed hexagonal lattice of bubbles in the clay. The next smallest blow bubbles to fill the interstices in this lattice; the smallest size blows bubbles in the interstices of the result. The final brick combines a rigid structure with an amazingly low density, and wonderful heat insulation.

To make good use of such bricks, they should be stacked together with a foamed mortar; so the ceramicists are inventing one. A fairly conventional mortar is mixed with detergent, foamed with compressed air, stored in a backpack and delivered by a sort of over-sized icing gun. Similarly, the interior walls and ceilings of the structure will be decorated with an equally light foamed plaster, and the roof will be covered with foamed tiles.

Most of the stresses in a normal building come from its own weight. So a foamed masonry building, much weaker but also much lighter than a conventional one, will be just as safe against gravitational collapse. The designer will merely have to secure it against wind loads and extreme internal distributions of people and things. It will be much easier to erect than a normal building, and much warmer when completed. And should an earthquake or a runaway vehicle bring it down, it will do far less damage.

David Jones