function, they should be feasible for receptor isolation.

The anti-idiotype approach has recently been employed by Vaux *et al.*[13] to isolate an intracellular receptor involved in the retention of proteins in the lumen of the endoplasmic reticulum (ER). As polypeptides retained in the ER all share the sequence KDEL at their C terminus, anti-idiotypic antibodies raised against the appropriate peptides led to the identification of an intracellular membrane glycoprotein of M_r 72K. The proof of its KDEL receptor activity was predicated on its ability to bind KDEL sequences *in vitro*.

The yeast homologue of the ER retention receptor recognizes a slightly different sequence (HDEL for *S. cerevisiae* and DDEL for *Kluyveromyces lactis*), and has been identified genetically[14,15]. Analysis of retention-defective mutants in yeast resulted in the identification of the HDEL and DDEL receptors as the products of the gene *ERD2*. The yeast HDEL/DDEL receptors are smaller (M_r, 26K) and are not glycosylated. In a report soon to be published[16], the same group has used the polymerase chain reaction to isolate the mammalian (human) homologue. Sixty-one per cent of the amino acids of the human homologue are identical in the sequences of one or the other yeast receptors, a very high degree of conservation. Although this poses a paradox that will have to be resolved, it is clear that the anti-idiotype approach did not pick up the product of the mammalian equivalent of *ERD2*. In the case of mitochondria, the anti-IT antibodies that detected MIR1 failed to react with the other protein precursor receptors MOM19 or ISP42.

A feature of all of the studies using anti-idiotypic antibodies is that the isolated receptor binds specifically to the requisite ligand. This is proof-positive that the method works. Yet the nagging question persists: is it possible that out of the myriad of possible surface epitopes on the hundreds of different cellular proteins in a given organelle, one or more just happens to be similar enough to a receptor-binding site to be picked up by this approach? These could include, for example, amphipathic, channel-forming helices of phosphate or nucleotide transporters. Research into protein transport, secretion and organelle assembly is currently dominated by the notion that protein precursors interact with moderate affinity with a host of intracellular proteins known as molecular chaperones[17]. An assumption is that the signal peptide is at least in part responsible for this interaction. Chaperones are one set of proteins that could be expected to present other protein precursor receptors and transporters with stiff competition for anti-idiotypic antibody binding, if for no other reason than their abundance. It may also be worth noting that phosphate and nucleotide transporter proteins are very abundant in mitochondria.

Given these limitations, it seems that the best use of the anti-idiotype approach would be as a coarse screen for putative receptors, augmented with reverse genetics to verify function *in vivo*. The comprehensive approach taken by Murakami *et al.*[2] included reverse genetics to confirm that the protein extracted with the anti-IT antibody has receptor activity. In the case of the knock-out of the *MIR1* gene, the result was a phenotype consistent with either aberrant transport of phosphate or import of protein precursors. In the case of the KDEL receptor, one hopes that its homologue will soon be found in a system that can be genetically manipulated. Loss of retention of polypeptides in the lumen of the ER should be easily detected. □

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Art for the anthropologist

THIS half-segment of a ceremonial Nazca tabard from the south coast of Peru appears in an exhibition and sale currently running in London. Made by sewing macaw feathers onto a cotton base, the vivid colours owe their preservation to burial in sand. During the period 200 BC–800 AD, the Nazca culture produced arguably the most exciting feather textiles in ancient Peru: a common theme is the Sun, resplendent with rays and facial features. This example shows the Sun in more contemplative mood. The image was produced very simply but is very effective.

The tabard will be on show with other Andean feather textiles and artefacts until 2 November at Thomas Gibson Fine Art, 44 Old Bond Street, London W1X 3AF, UK. Prices start at around £4,000. Thomas Gibson normally deals in modern art — but the gallery, like artists themselves, recognizes the connection between so-called 'primitive' art and the motives behind modernist movements as diverse as surrealism and abstract expressionism. H.G.