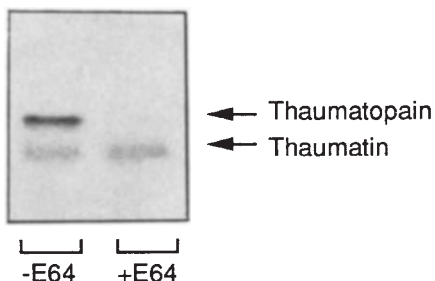


Thaumatococcus not proteolytic

SIR—Skern *et al.*¹ have recently called to attention a short region of homology between the sweet protein thaumatin, trypsin and a group of picornaviral proteases, proposing that this similarity may explain the apparent proteolytic



A crude aqueous extract of *Thaumatococcus daniellii* arils was activated with 30mM 2-mercaptoethanol, one half of the sample was treated with 100 μ M E64 (+E64) such that no residual activity towards ZFRNMc was measurable. Both samples were then treated with 30 μ M [¹⁴C] iodoacetate for 4 minutes, at which point unlabelled iodoacetate was added. The preparations were then separated by SDS-polyacrylamide gel electrophoresis, blotted onto nitrocellulose and subjected to autoradiography. Despite a 100:1 ratio of thaumatocysteinyl:thaumatopain in the crude extract, thaumatocysteinyl is preferentially labelled to a high level, provided the thaumatopain preparation was not previously inhibited by E64 (–E64). Incorporation of label into thaumatocysteinyl is not E64-sensitive.

activity of thaumatocysteinyl, and conjecturing that thaumatocysteinyl has cysteine protease activity². They suggest that treatment of thaumatocysteinyl with a reducing agent such as dithiothreitol breaks an exposed disulphide bond and generates a nucleophilic cysteine residue.

Such a cysteine protease activity would indeed be unusual; thaumatocysteinyl contains no histidine residues³ and thus lacks the normal catalytic triad that facilitates the activation of the nucleophilic cysteine residue⁴. But we have obtained evidence that the proteolytic activity of thaumatocysteinyl is an artefact⁵.

During our earlier work on the structure/sensory properties of thaumatocysteinyl, we observed that purified preparations (Talin, a gift from E. Rathbone) have significant amidolytic and proteolytic activity (towards Z-Phe-Arg-7-amido-4-methylcoumarylamide and radioiodinated insulin B chain, respectively). Both activities required prior activation with

reducing agents, and were inhibitable with classical cysteine-reactive reagents such as iodoacetate and the highly specific cysteine protease inhibitor E64. We used E64 to show that the amidolytic activity was completely suppressed after addition of 10 pmol E64 to a preparation containing 1 nmol thaumatocysteinyl. We conclude that the cysteine protease activity in thaumatocysteinyl preparations can be attributed to trace amounts of a contaminating protease, and that thaumatocysteinyl itself is not a protease⁵.

We have since isolated the cysteine protease, referred to as thaumatopain, from arils of *Thaumatococcus daniellii* (the source of thaumatocysteinyl); it has a relative molecular mass of 30,000 and shares many properties with classical cysteine proteases such as papain (M. C. *et al.* manuscript submitted). In crude aril extracts, thaumatopain is the source of the most nucleophilic cysteine residue. It is more basic than thaumatocysteinyls, which may explain why the more basic thaumatocysteinyl preparations (isolated by low resolution ion exchange chromatography) were

reported to possess greater proteolytic activity². Different batches of thaumatocysteinyl also differ in their ability to undergo autolysis (Dowswell and R. B. unpublished data).

We have searched the PIR and Swiss-Prot databases for the 'active-site' sequences GDSGG and GDCGG and found several matches to proteins not considered to be proteinases. We agree with Skern *et al.*¹ that apparent similarities may mislead and must be interpreted in the light of other experimental data. Such data suggest that thaumatocysteinyl itself is not proteolytically active.

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Immoral wasps?

SIR—The caption to the photograph of *Polistes* on the cover of your issue of 16 November last year says that wasps can be 'altruist'. That some actions by a wasp (or an ape, or a man) can be objectively described as increasing the fitness of another at the expense of the actor's own is not the point at issue. Ever since the classic paper¹ of W. D. Hamilton^{1,2}, such acts have been called 'altruistic behaviour', and the definition has become standard in evolutionary ethology.

Nevertheless, when teaching these matters, I have become increasingly uncomfortable about the use of the word 'altruism' in this context. If we agree that it is an important endeavour to afford an evolutionary explanation of human behaviour, we should acknowledge that the eventual synthesis will have to reconcile the points of view of biologists and of social scientists. In my experience, reconciliation with the usage of social scientists will stumble on this word even when it is carefully defined, because we "use the word in a restricted . . . sense, only superficially related to common usage"³.

There is no inconvenience in using the same word for two clearly distinct meanings in fields that are also clearly distinct. Nobody would ever suggest that the charms of Madonna, say, are directly related to those of her constituent quarks. But extending the concepts of animal ethology to human behaviour implies that we are ready to use the same unambiguous vocabulary throughout the field.

Ethology aims at describing and understanding behaviour in terms as objective as possible and, in any case, without connotations of moral value. But

when anybody, even a sociobiologist, calls a human action "altruistic", he clearly refers to the moral value of that action. His statement implies reference to a cultural scale of moral values as well as a recognition of the responsibility of the actor. Neither a wasp nor an ape, or even an insane man, can be regarded as morally responsible and, when it comes to human behaviour, explaining is not the same as judging.

It follows that, if we are to include the study of human behaviour within comparative ethology, we have to respect the rules of priority and of clarity by which we abide in biology. Priority in the use of 'altruism' in its ethical sense cannot be disputed. I therefore propose that in ethology and evolutionary biology we coin a new word, as free as possible of ethical connotations, to designate those behaviours that, on a strictly descriptive level, resemble altruism.

A good candidate would be "euxeny" (euxenic), from the greek ευξενιος, meaning "favourable to strangers, hospitable". To my knowledge, the word is used neither in biology nor the social sciences. I appreciate that changing a habit of 25 years would not be easy, but if in doing so we avoid some pointless disputes about sociobiology, the effort might be worthwhile.

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