

DETERMINATION OF PHENYLALANINE, TYROSINE, DOPA AND TRYPTOPHAN IN BOVINE AQUEOUS AND VITREOUS HUMOUR

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We have recently described procedures, using gas chromatography-negative ion chemical ionisation mass spectrometry (GC-NICIMS), to identify and quantify biogenic amines and their metabolites; p-tyramine, dopamine, 5-hydroxytryptamine, p-hydroxyphenylacetic acid, homovanillic acid, p-hydroxymandelic acid, dihydroxyphenylacetic acid and dihydroxymandelic acid, in bovine retina, vitreous and aqueous humour (Macfarlane et al 1989, Midgley et al 1990). The results from these studies indicated that the role of biogenic amines and their metabolites in the eye was more complex than previously thought. In order to elucidate further the role of such substances in visual processes a suitable technique was required to identify and quantify their amino acid precursors in the bovine aqueous and vitreous humour. The free amino acid content of human vitreous humour in cot deaths has been reported previously using an amino acid analyser with norleucine as an internal standard (Patrick and Logan 1988). To the best of our knowledge there are no reliable reports on the concentrations of phenylalanine, tyrosine, DOPA and tryptophan in the eye. The amino acids were determined using a method previously described (Macfarlane et al 1990).

Table 1 indicates the mean levels of phenylalanine, tyrosine, DOPA and tryptophan in aqueous and vitreous humour from freshly slaughtered cattle. The numbers in brackets indicate the number of samples analysed in each group.

TABLE 1 Amino acids in bovine aqueous and vitreous humour ($\mu\text{g/ml}$)

	Aqueous (9)	Vitreous (9)
phenylalanine	18.52 \pm 2.58	5.71 \pm 1.37
tyrosine	22.68 \pm 4.02	6.15 \pm 1.44
DOPA	0.13 \pm 0.11	0.10 \pm 0.06
tryptophan	13.33 \pm 5.77	5.63 \pm 1.43

Preliminary results indicate that the bovine aqueous humour contains higher concentrations of amino acids than the vitreous and that the concentrations of phenylalanine and tyrosine are high compared with that of DOPA. The high concentration of tyrosine correlates with our previously measured high concentrations of p-hydroxyphenylacetic acid in bovine aqueous and vitreous humour (Midgley et al 1990).

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