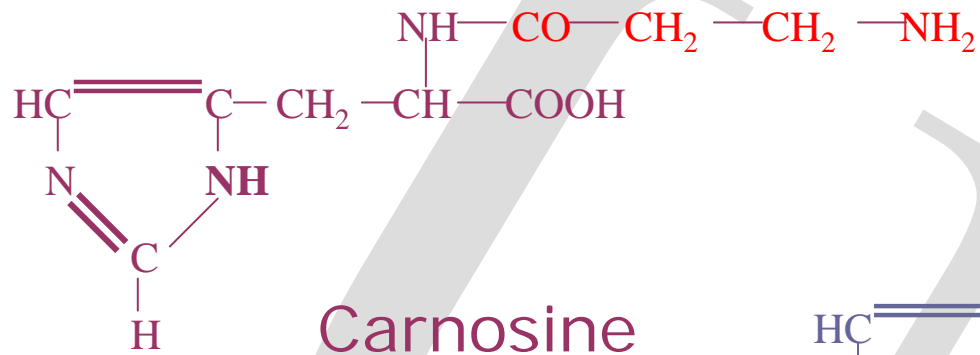


Turkey as a viable source of the pluripotent wonder supplement: Carnosine

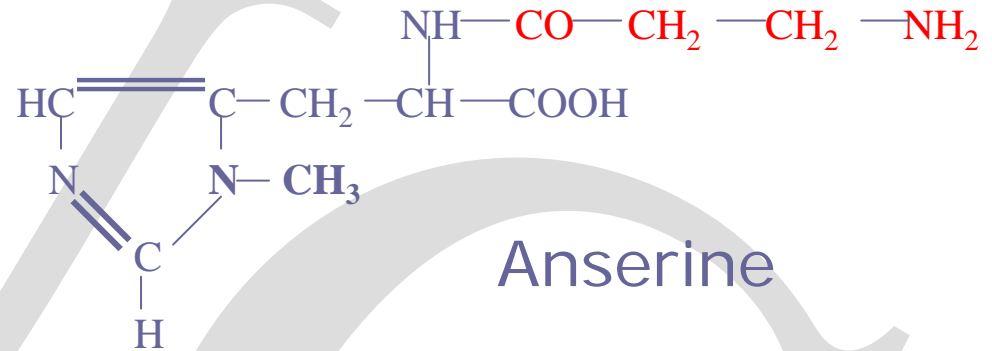
Glenys Jones

UNIVERSITY OF
Chichester

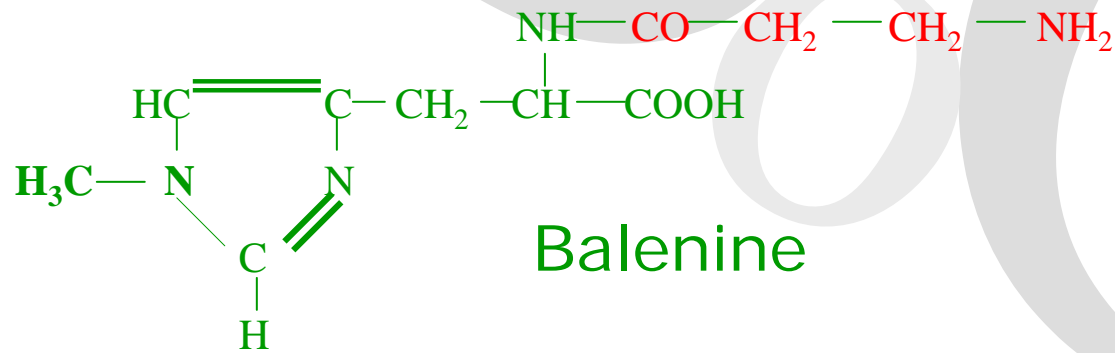
Imizadole (Histidine containing) Dipeptides



Carnosine



Anserine



Balenine

Carnosine

Carnosine:

- ★ enzyme regulation (Johnson & Aldstadt, 1984)
- ★ free radical quenching (Chasovnikova *et al.*, 1990)
- ★ physicochemical buffer within skeletal muscle (Bate-Smith, 1938)

Buffering:

- ★ Imizadole ring of carnosine has a pKa of 6.83

Carnosine

Carnosine and anserine:

- ★ enzyme regulation (Johnson & Aldstadt, 1984)
- ★ physicochemical buffer within skeletal muscle (Suzuki *et al.*, 2002)
- ★ free radical quenching (Chasovnikova *et al.*, 1990)

Buffering:

- ★ Imizadole ring of anserine has a pKa of 7.04
- ★ 12-13% muscle buffering could account for by histidine and imizadole dipeptides (Okuma & Abe, 1992)

❖ Histidine + β -alanine = carnosine (in humans)

❖ Histidine – plentiful supply within the body

❖ β -alanine – small amounts produced from uracil in the liver
⇒ limiting factor

❖ Serum carnosinase breaks carnosine down into β -alanine and histidine & anserine into β -alanine and 1-methyl-histidine

(Chan et al., 1994)

Benefits to athletes

★ β -alanine supplementation:

>60% increase in muscle carnosine concentration

(Harris et al 2006, Hill et al 2007)

13% increase in paced high intensity cycling performance

20% increase in endurance of knee extensors under continuous fatigue

Could be the difference between winning a medal or not!

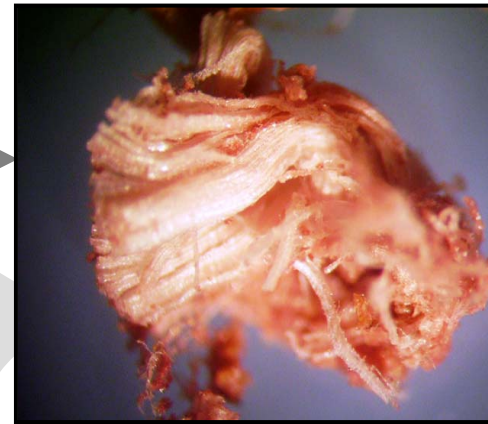
Benefits to health

- Improvements in memory recall, language and communication in autistic spectrum disorders
- Control of secondary symptoms in diabetes
- Delayed onset and progression of Alzheimer's disease
- Anti-ageing
- Anti-oxidant

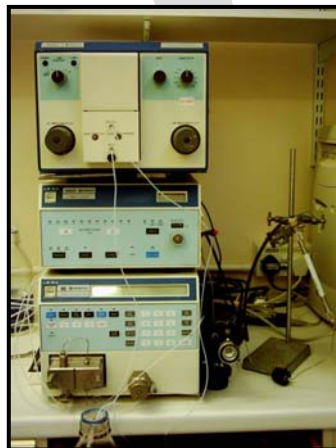
Sources



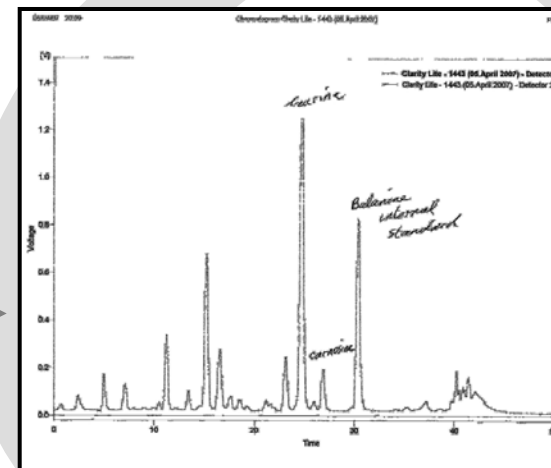
Meat sample



Freeze dried



HPLC Analysis



Quantifiable Chromatogram Output

Sources

★ Natural sources:

~800mg
β-alanine

Turkey Breast	150 g
Chicken Breast	175 g
Tuna	248 g
Beef	385 g
Lamb	410 g
Pork	618 g

Uptake

- ★ Chicken Breast Extract ingestion:

- ★ increases plasma concentrations of histidine, β -alanine and 1-methyl-histidine

- ★ Improves exercise tolerance concurrent with elevations in carnosine content in skeletal muscle

(Suzuki *et al.*, 2004, Harada *et al.*, 2002)

- ★ Chicken breasts heated for 5h with 1.5vol boiling water.

- ★ Carnosine and anserine are heat stable therefore remaining intact post cooking

Supplemented Turkeys

Water in drinkers supplemented with β -alanine

Increases seen in histidine dipeptide content of breast muscle in stags and hens post 2 weeks supplementation.

120g turkey breast – 2 weeks supplementation

75-80g turkey breast – 9 weeks supplementation

Turkey can provide a viable dietary source to increase muscle carnosine concentrations to the levels beneficial to health.

The English Institute of Sport and Korean National Sports are using turkey alongside supplements as a way to improve performance!