# Nothing is ever wasted

Dr George Grimble
Institute for Liver and Digestive Health
Division of Medicine

# Professor Chris Pennington (1946-2002)

The only son of a Welsh Methodist Minister who grew up in Wales and the West Country.

Consultant Physician and Gastroenterologist in Dundee in 1979

Professor of Medicine in 1998.

# What I'd like to talk about

A long career can encompass many interests

Sudden changes of direction are normal

Working together in teams is the best way

Know why you're doing what you're doing

Nothing is ever wasted

# Early days

NATURE VOL. 241 JANUARY 19 1973

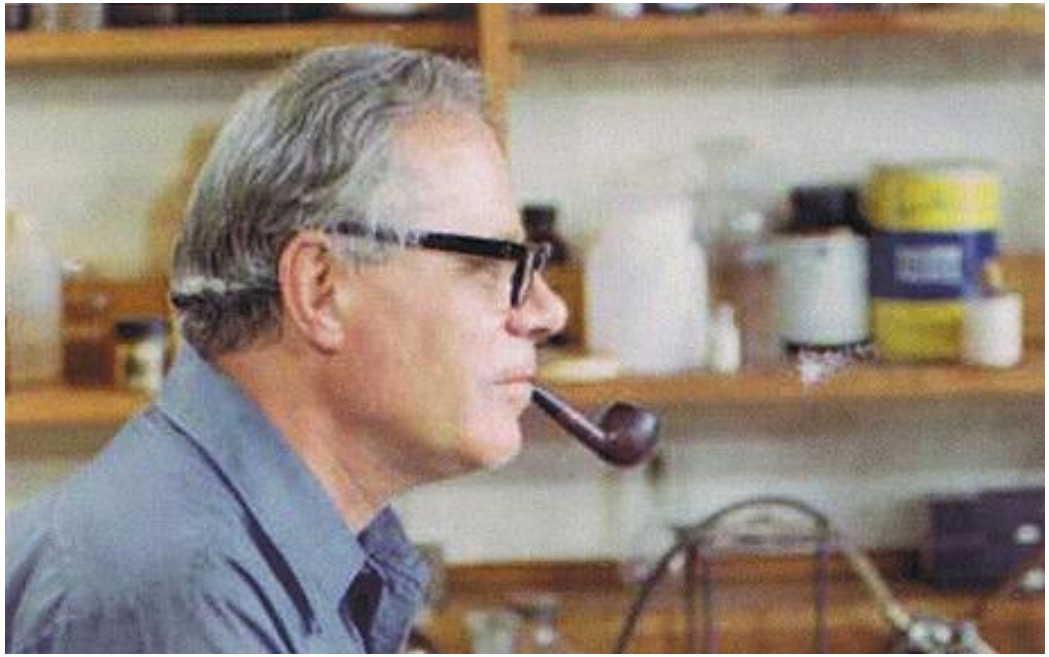
## Relationship between Protein Synthesis and RNA Content in Skeletal Muscle

EXTENDING our studies on the adaptation of muscle synthesis to dietary stress[1,2], we investigate here the relationship between concentrations of tissue RNA and rates of protein synthesis. Dietary regimes which depress protein synthesis also lead to a fall in tissue RNA content[3,4].

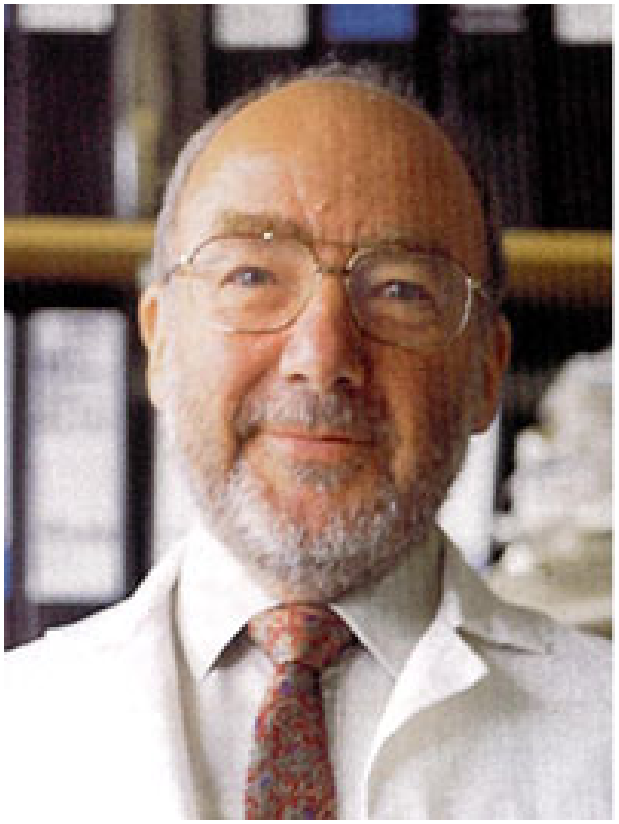
*Clinical Nutrition and Metabolism Unit, Hospital for Tropical Diseases, 4 St Pancras Way, London NW1 2PE*

D. J. MILLWARD
P. J. GARLICK
W. P. T. JAMES
D. O. NNANYELUGO
J. S. RYATT


# Early days



MRC Medical Research Council



LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE

# Early days

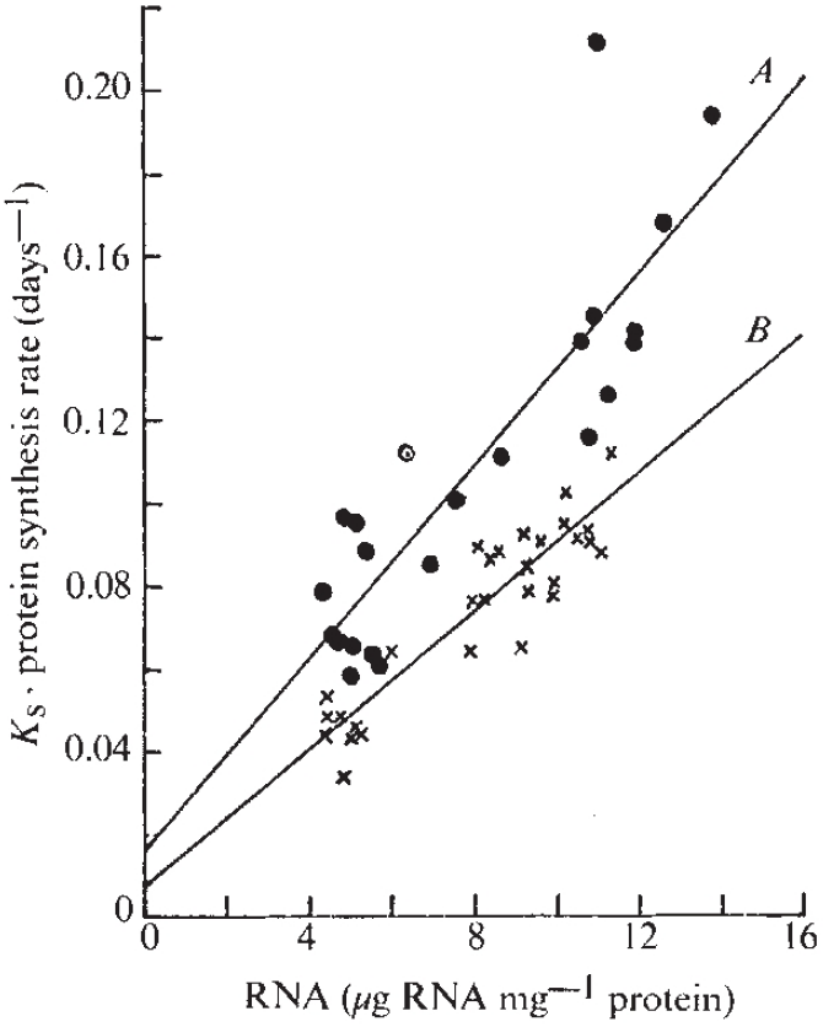
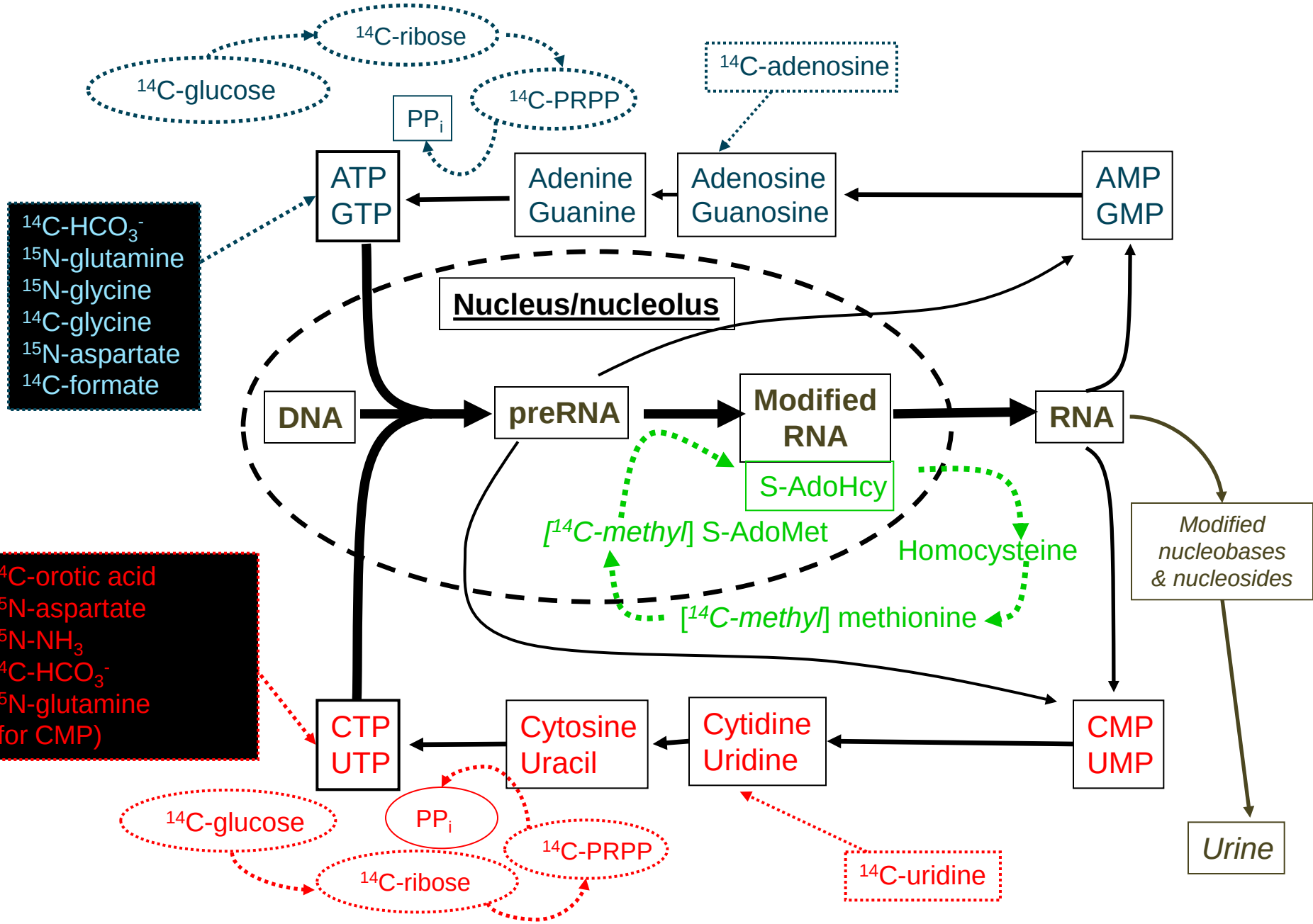


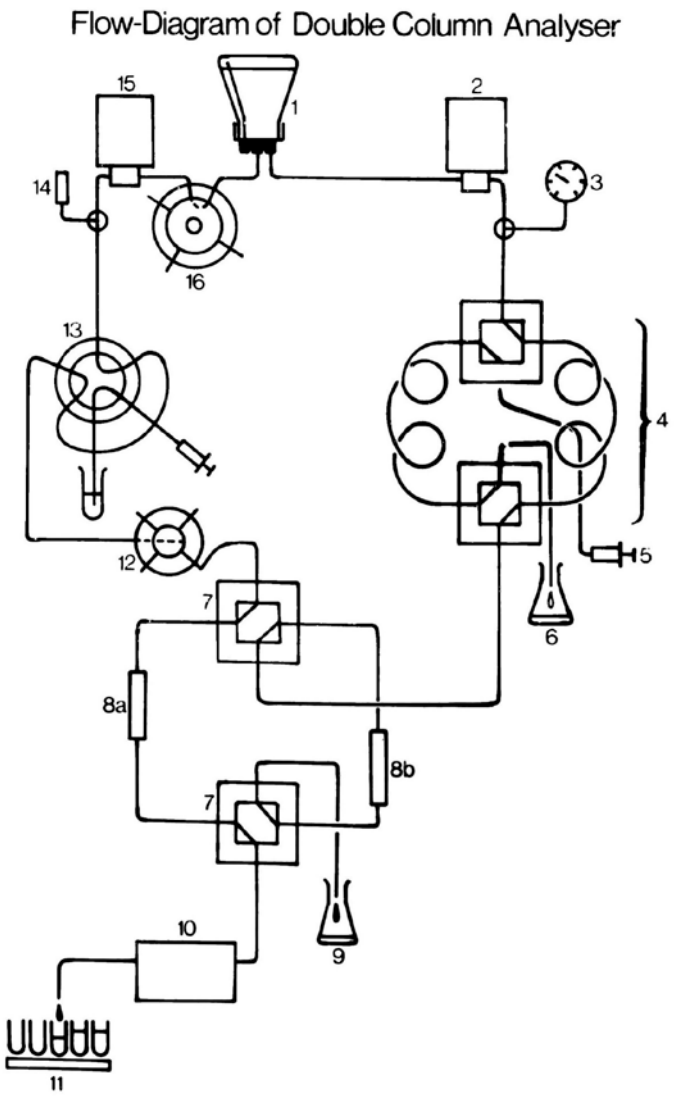

**Fig. 1** Relationship between rates of protein synthesis and RNA concentrations in rat skeletal muscle. Results are the individual results shown as means of groups in Table 1. The regression analyses were performed separately on groups *A* and *B*. The lines correspond to equations

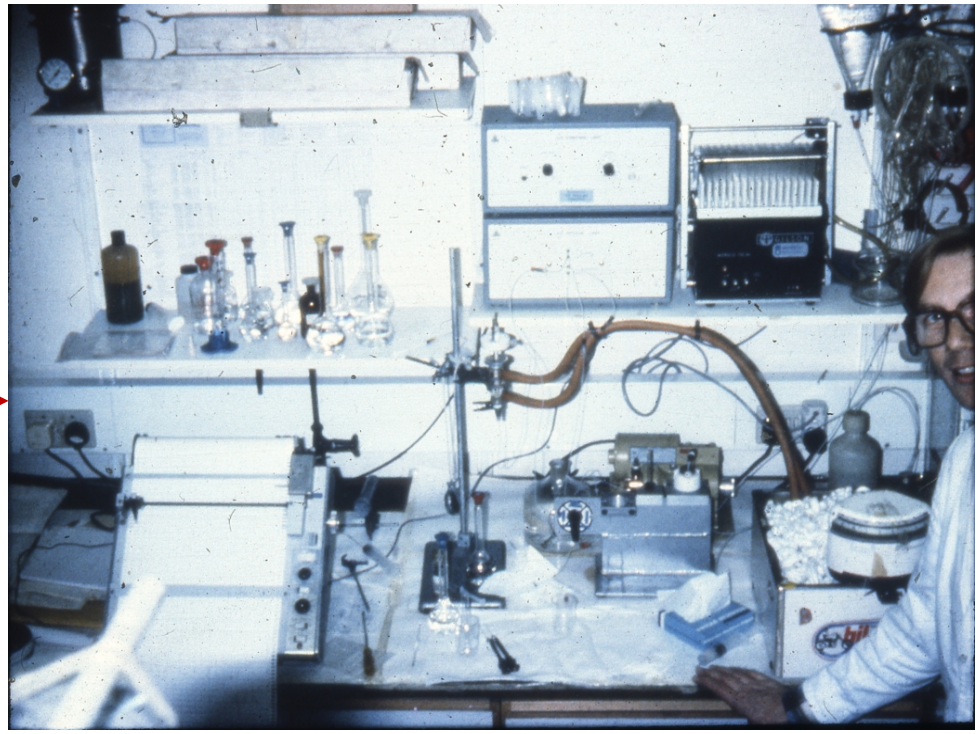
# RNA turnover is more complex



# Early days

# Zen & the Art of Motorcycle Maintenance



# What was discovered

Muscle ribosomes are made at about the same rate as muscle myofibrillar protein

Liver ribosomes are synthesised somewhat slower than liver protein but faster than muscle ribosomes

Protein depletion and short-term starvation inhibits these processes

***"Just when I nearly had the answer, I forgot the question"***

# Sudden changes of direction are normal



# The challenge of short-bowel syndrome

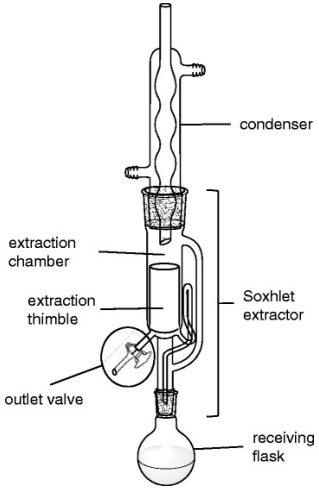
Measuring macronutrient absorption by balance studies

Measuring micronutrient absorption by balance studies

Antiquated and laborious methods

Energy content

Lipid content




# Conclusions

Gastroenterology and Nutrition are grand topics

Use the best kit to measure things quickly

# Working together in teams is the best way

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JOURNAL OF PARENTERAL AND ENTERAL NUTRITION

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## Administration of Fat Emulsions with Nutritional Mixtures from the 3-Liter Delivery System in Total Parenteral Nutrition

G. K. GRIMBLE, B.SC., PH.D., R. G. REES, B.MED.SC., M.R.C.P., D. H. PATIL, M.B.B.S., M.R.C.P., P. P. KEOHANE, M.B.B.S., M.R.C.P., H. A. ATTRILL, S.R.N., P. G. FROST, M.SC., M.R.C.PATH., A. R. CRIBB, B.PHARM, M.P.S., AND D. B. A. SILK, M.D., F.R.C.P.

*From the Departments of Gastroenterology and Nutrition, Pharmacy and Chemical Pathology, Central Middlesex Hospital, London, England*

CENTRAL MIDDLESEX HOSPITAL NHS TRUST

# First forays into clinical nutrition

## Administration of Fat Emulsions with Nutritional Mixtures from the 3-Liter Delivery System in Total Parenteral Nutrition

*To the Editor:*

In their recent paper Grimble et al,[1] reported their experience of the administration of total parenteral nutrition with 3-liter mixes involving the fat emulsion Lipofundin S.

We agree that the use of lipid containing mixes in parenteral nutrition has many theoretical and practical advantages.

**BUT……..**

It would be of interest to know if this catheter occlusion occurs with other lipid sources and until this question is clarified caution is advised in the use of three in one mixes for patients receiving prolonged treatment.

J. MAIN, MBChB, M.R.C.P. (UK)
C. R. PENNINGTON, B.Sc., M.D., F.R.C.P. (Ed)

J. Main, C. R. Pennington, and J. M. Richards. Administration of fat emulsions with nutritional mixtures from the 3-liter delivery system in total parenteral nutrition. J.Parent.Ent.Nutr. 10 (2):247-249, 1986.

# A scientist's response

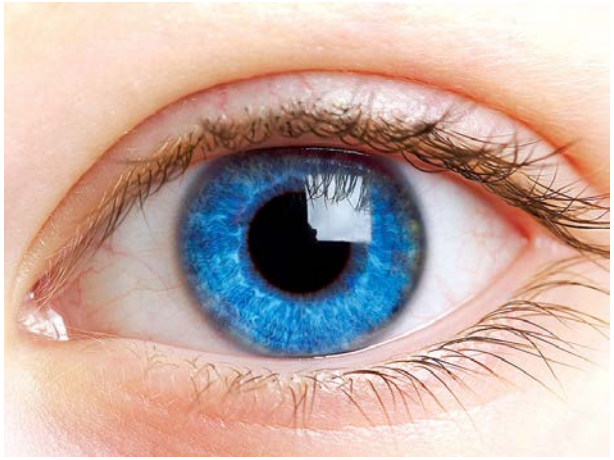
"intrinsic stability and clearance rates"

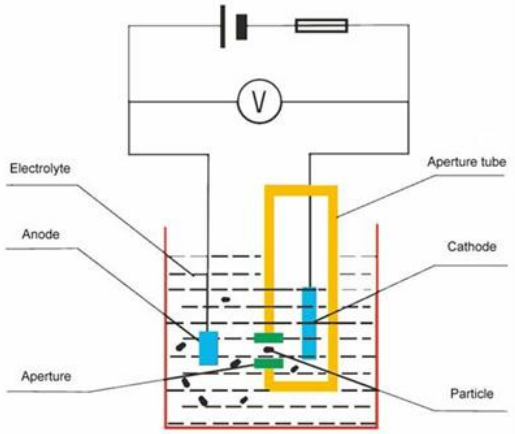
"hemodynamic shear forces would tend to disperse agglomerates"

"Strictly speaking it is the effective electrolyte composition (the weighted average of all cations present)"

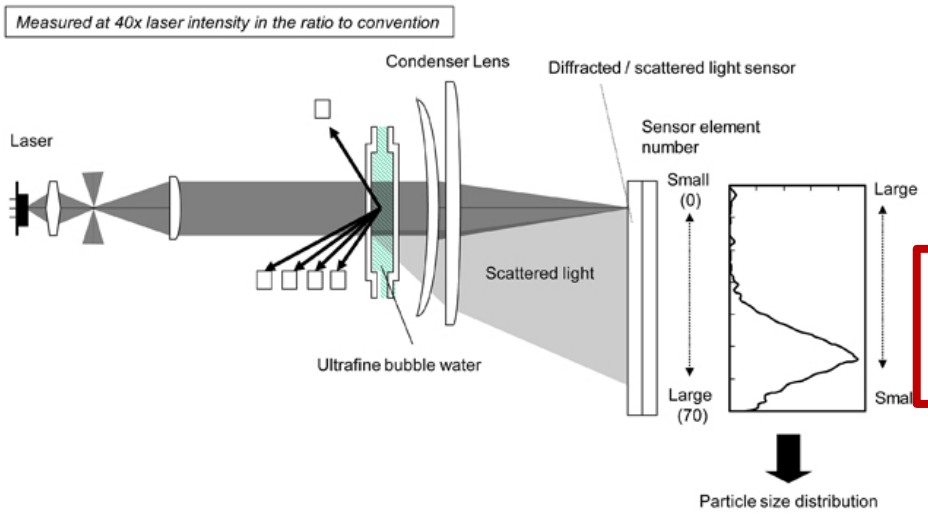
"it is the effect on the zeta potential which determines instability for any emulsion"

# How to measure TPN lipid stability

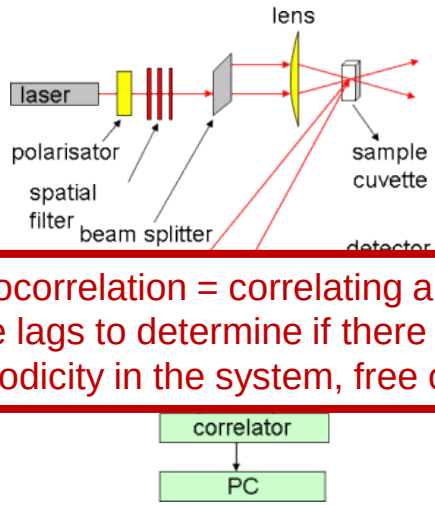





Coulter Principle




Fraunhofer Diffraction

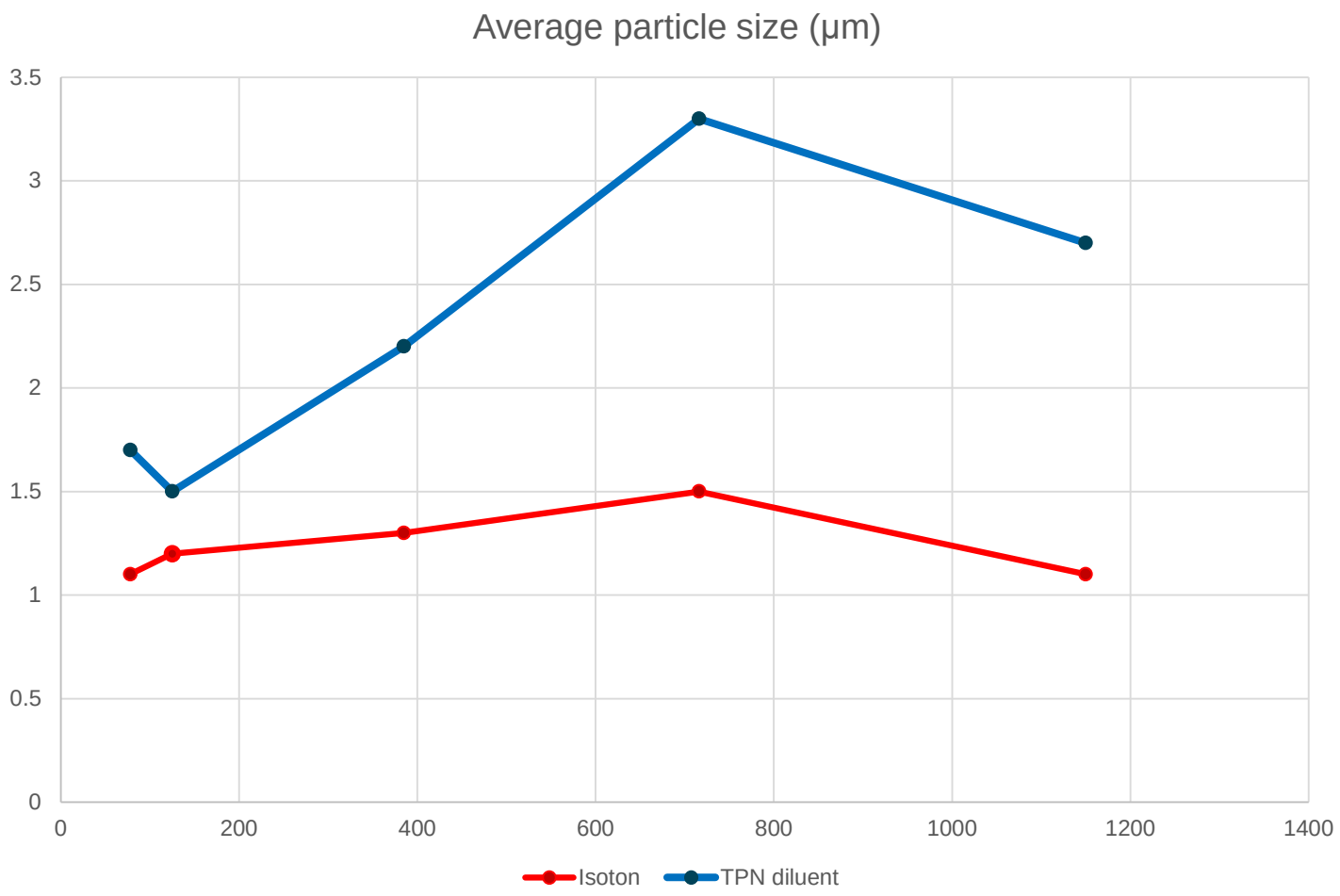



Autocorrelation = correlating a signal at different time lags to determine if there is an underlying periodicity in the system, free of noise.

Photon Correlation Spectroscopy

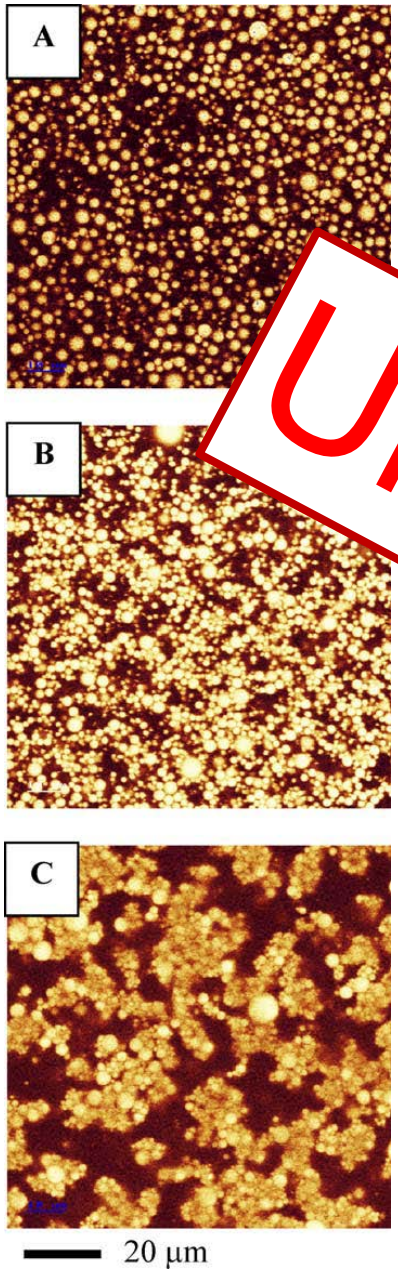
# Do divalent cations destabilise TPN?

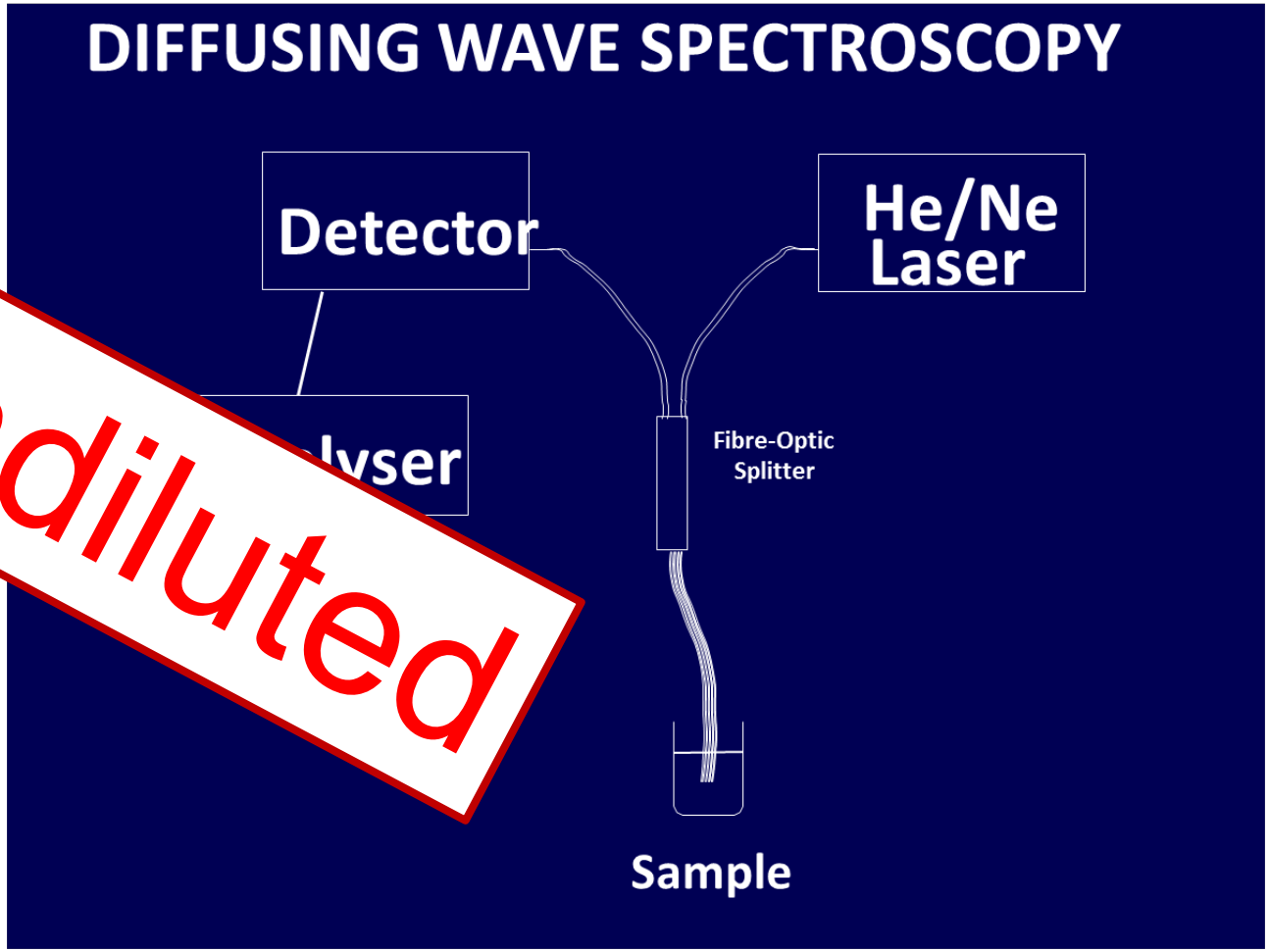
## Coulter counting




M. K. Hunjan, G. K. Grimble, J. J. Payne-James, and D. B. A. Silk. The effect of $Ca^{2+}$ and $Mg^{2+}$ on lipid emulsion stability in a TPN mixture. Clin.Nutr. 7 (Suppl):74, 1988. (Abstract)

# How to measure TPN stability

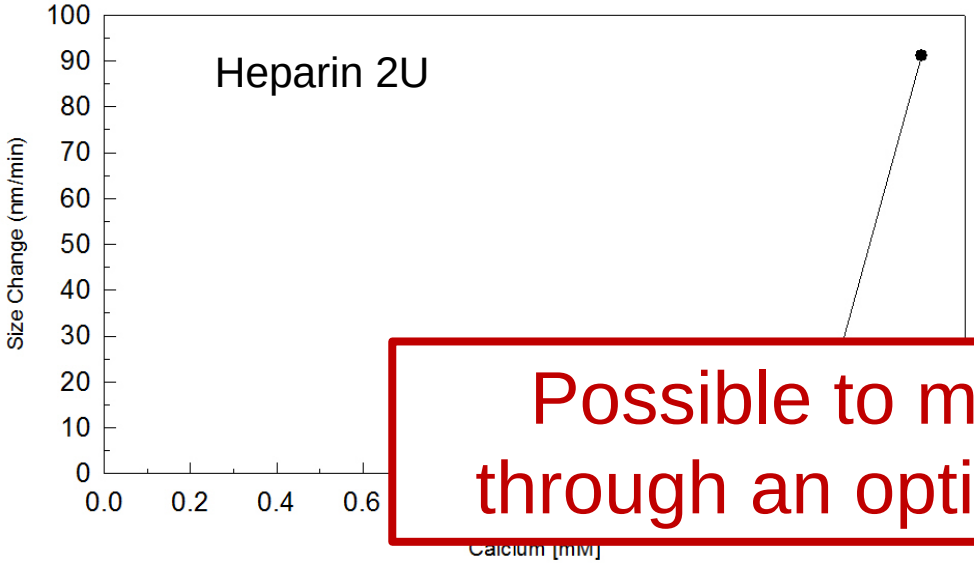


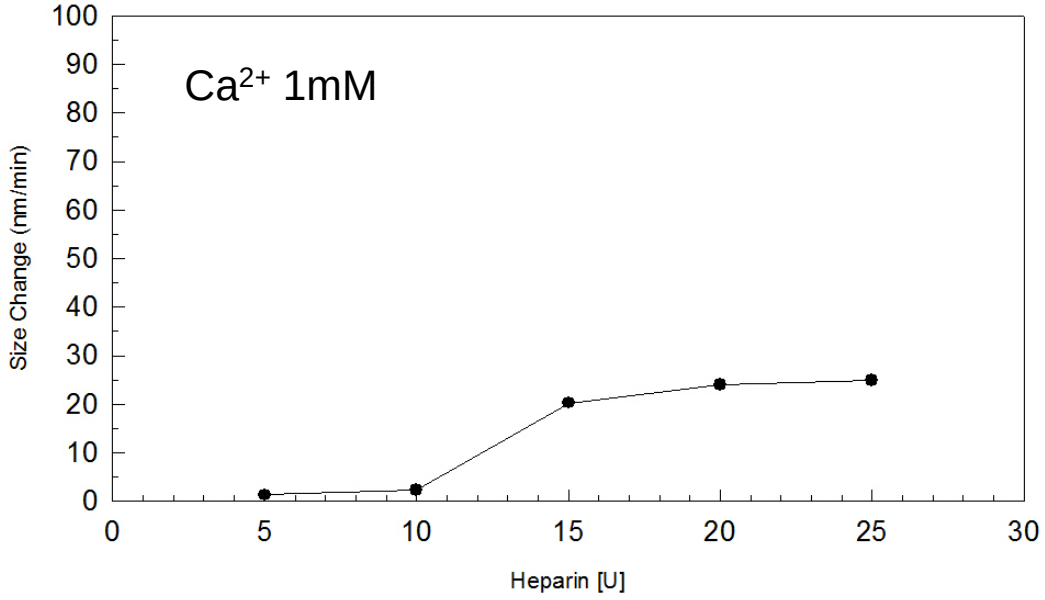

Undiluted

Y. Hemar, D. N. Pinder, R. J. Hunter, H. Singh, P. Hebraud, and **D. S. Horne**. Monitoring of flocculation and creaming of sodium-caseinate-stabilized emulsions using diffusing-wave spectroscopy. J Colloid Interface Sci 264 (2):502-508, 2003.

# Do $Ca^{2+}$ and Heparin destabilise?




Possible to measure through an optical port?




Horne and Grimble 1992 - unpublished

# Conclusions

Measuring emulsion stability in situ is very difficult

Flocculation may be mistaken for coalescence

Use formulations known to be stable

It’s always good to look at the TPN bag!

Back to Chris Pennington

# A Welsh clinician's solution


*"Because of the lipid nature of the deposit we evaluated the use of ethanol in the restoration of catheter patency"*

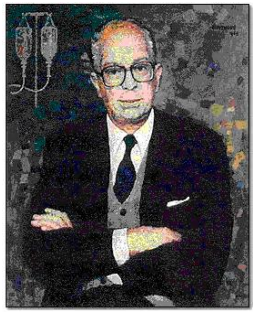
C. R. Pennington, J. Main, and A. Pithie. Lipid deposition in central venous catheters: a solution. Lancet 1 (8591):947, 1988.

# Revolutionising TPN

We didn’t intend to follow this path but the opportunity arose

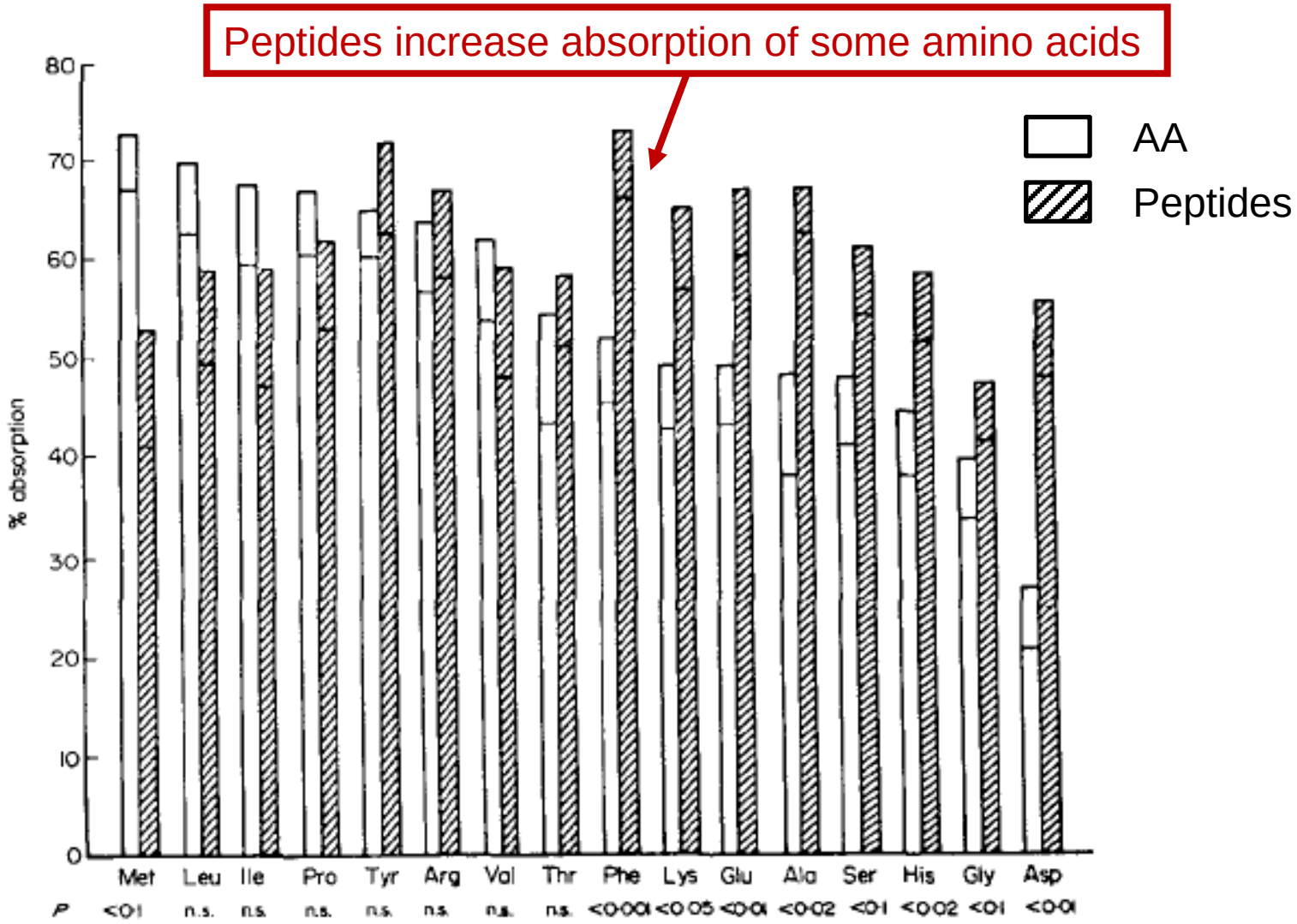
The context was a series of physiological studies of intestinal absorption

It is a case study in collaborative work



# Kinetic advantage of peptides

Silk et al. *J.Parent.Ent.Nutr.* 4 (6):548-553, 1980



# Studies with di- and tripeptides

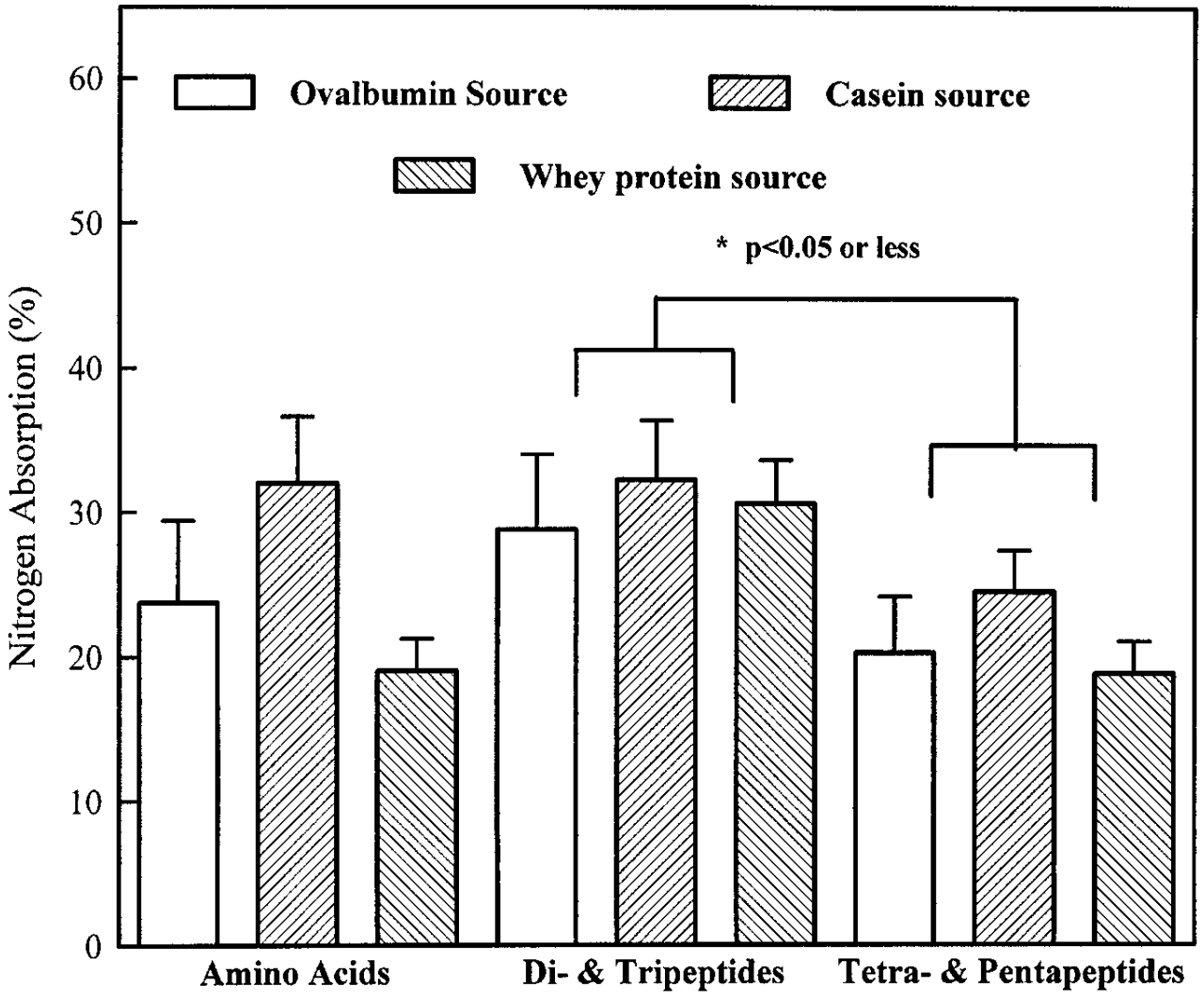
We were approached by a French company which had developed a technology for making hydrolysates which contained mainly di- and tripeptides

J. Chataud, S. Desreumaux, and T. Cartwright. Procede de fabrication d'un hydrolysat enzymatique de proteines riche en di- et tri-peptides, utilisable notament en nutrition artificielle et en dietetique (Process for the manufacture of an enzymatic protein hydrolysate rich in dipeptides and tripeptides, which can be used especially in artificial nutrition and dietetics. French Patent Application:86 17516, 1986. 12-15-1986.

The methodology for assessing peptide chain-length profile was sound

Sequencing +

# Summary of perfusion studies




Grimble et al 1987, 1988, 1994

# What is a protein hydrolysate?

**A partial hydrolysate of food protein**

**With a huge range of properties**

Solubility – more soluble than the parent protein

Surfactant – shampoos

Antioxidants – great chelators

# What is a protein hydrolysate?

**A partial hydrolysate of food protein**

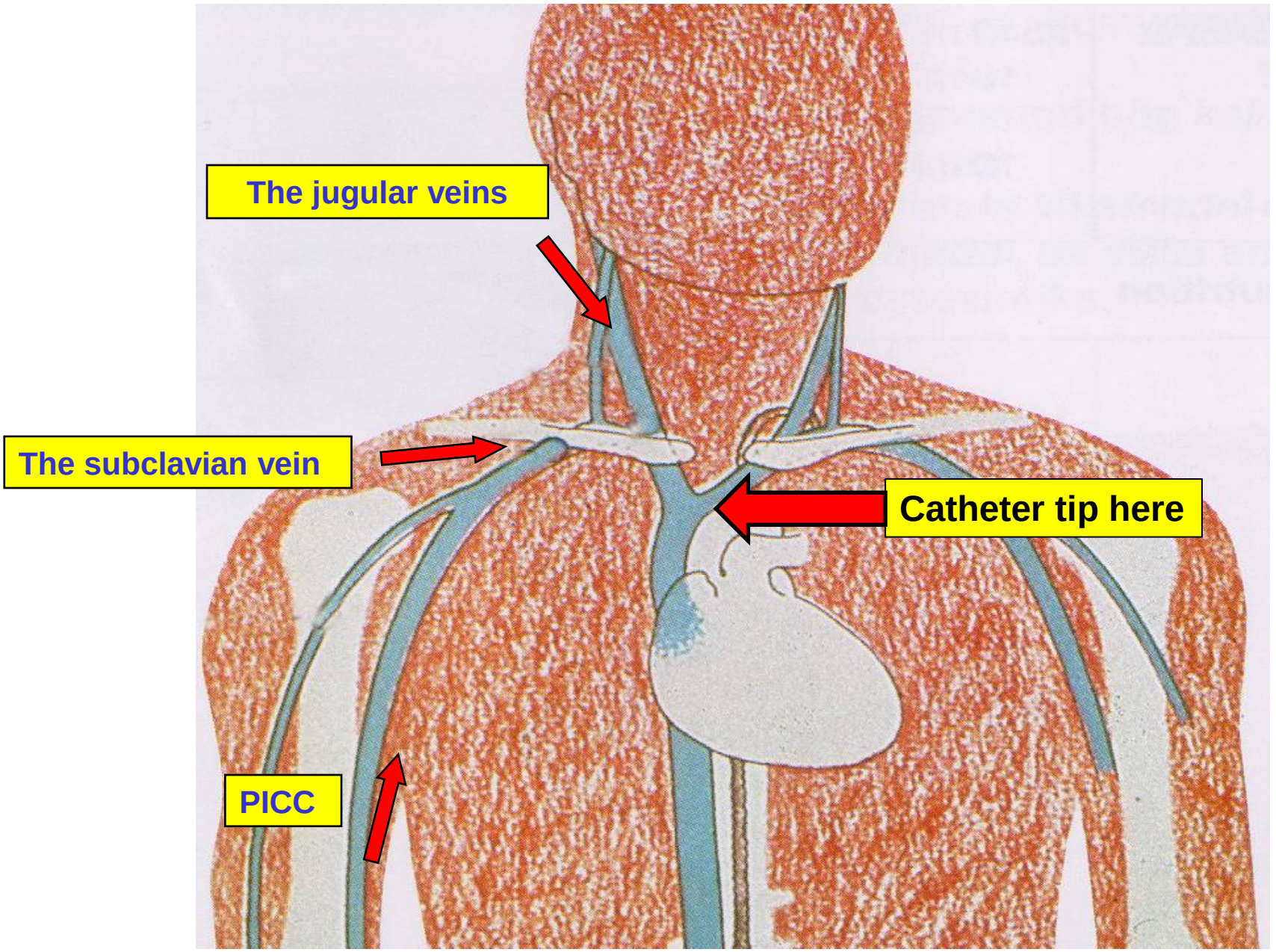
**With a huge range of properties**

A complex mix of peptides of varying size and sequence

# What is a protein hydrolysate?

## ……..an almost irresistible challenge to the bio-analyst!

# Central vein catheterization



# Peripheral venous access

# The need

G. K. Grimble, J. J. Payne-James, C. J. de Gara, S. K. Rana, J. Doherty, and D. B. A. Silk. Nutritional Support - UK 1988: Survey results. Clin.Nutr. 8 (Suppl):92, 1989. (Abstract)

J. J. Payne-James, C. J. de Gara, G. K. Grimble, M. J. Bray, S. K. Rana, S. Kapadia, and D. B. Silk. Artificial nutrition support in hospitals in the United Kingdom - 1991: Second national survey. *Clin.Nutr. 11 (4):187-192, 1992.*

J. J. Payne-James, C. J. de Gara, G. K. Grimble, and D. B. Silk. Artificial nutrition support in hospitals in the UnitedKingdom - 1994: Third national survey. *Clin.Nutr. 14 (6):329-335, 1995.*

80% of TPN courses <7 days

Could these courses be given peripherally?

# The **BIG IDEA**

What if we put TPN into a peripheral vein?

# Peripheral Parenteral Nutrition

**Avoids main source of complications**

**Easy to administer**

# Modern intravenous amino acid solutions

| Solution | Moriamin Forte VuJ-N | VuJ-N Howe et al 1946 Original i.v. amino acid solution | Aminosyn II 8.5% | Synthamin 8.5% | Travasol 10% | Aminoplasmal 10% | FreAmine III 10% | Aminosyn 8.5% | Clinimix /Clinimix E |
|---|---|---|---|---|---|---|---|---|---|
| Application | Supplement | | Maintenance | Maintenance | Maintenance | Maintenance | Maintenance | Stress | Stress |
| Manufacturer | Moriamin | | Hospira | Baxter | Baxter | B Braun | B Braun | Hospira | Baxter |
| L-Leucine | 21.9 | 19.5 | 10.4 | 7.4 | 7.4 | 8.9 | 9.4 | 7.3 | 7.4 |
| L-Ileucine | 7.1 | 8.7 | 6.9 | 6.1 | 6.1 | 5.1 | 7.1 | 9.7 | 6.1 |
| L-Valine | 8.0 | 6.8 | 4.3 | 5.9 | 5.9 | 4.8 | 6.8 | 8.1 | 5.9 |
| L-Phenylalanine | 6.0 | 9.7 | 3.1 | 5.7 | 5.7 | 5.1 | 5.8 | 4.6 | 5.7 |
| L-Tryptophan | 6.0 | 2.0 | 1.7 | 1.8 | 1.8 | 1.8 | 1.5 | 1.8 | 1.8 |
| L-Lysine | 24.0 | 11.0 | 7.8 | 4.7 | 4.7 | 5.6 | 7.5 | 5.3 | 4.7 |
| L-Histidine | | 4.5 | 3.1 | 4.9 | 4.9 | 5.2 | 2.9 | 3.1 | 4.9 |
| L-Methionine | 22.0 | 7.5 | 1.8 | 4.0 | 4.0 | 3.8 | 5.5 | 4.1 | 4.0 |
| L-Threonine | 5.0 | 10.2 | 4.2 | 4.2 | 4.2 | 4.1 | 4.1 | 5.5 | 4.2 |
| L-Cysteine | | | | | | 0.5 | 0.2 | | |
| L-Tyrosine | | | 2.3 | 0.4 | 0.4 | 1.3 | | 0.5 | 0.4 |
| L-Arginine | | 8.9 | 10.6 | 11.6 | 11.6 | 9.2 | 9.8 | 10.2 | 11.6 |
| L-Asparagine | | | | | | 3.3 | | | |
| L-Glutamine | | | | | | | | | |
| Glycine | | 11.2 | 5.2 | 10.4 | 10.4 | 7.9 | 14.4 | 13.2 | 10.4 |
| L-Serine | | | 5.5 | 5.1 | 5.1 | 2.4 | 6.1 | 4.4 | 5.1 |
| L-Proline | | | 7.5 | 6.9 | 6.9 | 8.9 | 11.6 | 9.0 | 6.9 |
| L-Alanine | | | 10.4 | 20.9 | 20.9 | 13.7 | 7.3 | 13.2 | 20.9 |
| L-Glutamic acid | | | 7.7 | | | 4.6 | | | |
| L-Aspartic acid | | | 7.3 | | | 1.3 | | | |
| L-Ornithine | | | | | | 2.5 | | | |
| Taurine | | | | | | | | | |
| Total Free AA (%) | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| E/N Ratio | | 3.98 | 0.77 | 0.81 | 0.81 | 0.84 | 1.03 | 0.98 | 0.81 |
| BCAA/Aromatic | 6.18 | 3.61 | 4.00 | 3.18 | 3.18 | 2.94 | 4.04 | 4.95 | 3.18 |
| Leu+Ile + Val (%) | 37.0 | 35.1 | 21.6 | 19.3 | 19.3 | 18.8 | 23.3 | 25.2 | 19.3 |
| Conditionally essential (%) | 0.0 | 20.1 | 31.2 | 34.4 | 34.4 | 33.5 | 42.0 | 37.3 | 34.4 |

# The first intravenous amino acid solutions

UCL

| Solution | Vuj | VujN | Aminosol | Moriamin S (Vuj-N) | ES Polytamin (FAO) | Klinitiamin (Plasma) | Moripron | Ispol FAO/WHO | Proteamin FAO/WHO | Trophysan |
|---|---|---|---|---|---|---|---|---|---|---|
| Application | i.v. amino acid solution | i.v. amino acid solution | i.v. protein hydrolysate solutions | | | | | | | |
| Manufacturer | | | Kabi Vitrum | Moriamin | Daigo-eiyo Co. | Eisai Inc | Roussel Morishita | Daigo | Tanabe Pharma Co. | Baxter |
| L-Leucine | 16.0 | 19.5 | 11.2 | 15.1 | 11.8 | 7.1 | 12.6 | 10.3 | 10.0 | 5.3 |
| L-Ileucine | 11.2 | 8.7 | 7.1 | | 10.4 | 6.8 | 5.7 | 7.4 | 5.3 | 3.3 |
| L-Valine | 14.5 | 6.8 | 5.0 | | 10.4 | 7.1 | 4.5 | 7.6 | 6.1 | 4.5 |
| L-Phenylalanine | 7.2 | 9.7 | 5.5 | | | 7.1 | 9.4 | 11.2 | 8.6 | 4.5 |
| L-Tryptophan | 1.9 | 2.0 | 1.1 | | | 1.6 | 1.3 | 1.9 | 1.6 | 2.0 |
| L-Lysine | 10.2 | 11.0 | 7.2 | | | | 8.9 | 7.2 | 6.9 | 8.2 |
| L-Histidine | 4.2 | 4.5 | 2.5 | | | | 6.1 | 3.9 | 4.6 | |
| L-Methionine | 6.3 | 7.5 | 2.4 | | | | 3.5 | 4.7 | 3.8 | 5.4 |
| L-Threonine | 11.2 | 10.2 | 4.3 | | | | 6.6 | 5.2 | 4.4 | 3.3 |
| L-Cysteine | | | | | | | | 0.2 | 0.2 | |
| L-Tyrosine | | | 1.2 | | | | 0.4 | 0.5 | 0.5 | |
| L-Arginine | 6.9 | 8.9 | 2.9 | 8.1 | 9.0 | | 8.0 | 8.7 | 10.8 | 2.4 |
| L-Asparagine | | | | | | | | | | |
| L-Glutamine | | | | | | | | | | |
| Glycine | 10.4 | 11.2 | 2.0 | 12.3 | 16.2 | 8.5 | 10.8 | 16.0 | 13.8 | 61.1 |
| L-Serine | | | 7.3 | | | 5.4 | 2.2 | 2.1 | 4.1 | |
| L-Proline | | | 9.3 | | | 5.2 | 3.3 | 2.1 | 9.4 | |
| L-Alanine | | | 2.9 | | | 5.4 | 6.3 | 4.2 | 7.2 | |
| L-Glutamic acid | | | 21.9 | | | 9.0 | 6.6 | 1.6 | 0.9 | |
| L-Aspartic acid | | | 5.9 | | | 6.6 | 3.8 | 5.2 | 1.8 | |
| Total Free AA (%) | 100.0 | 100.0 | 99.7 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| E/N Ratio | 4.79 | 3.98 | 0.87 | 3.90 | 2.98 | 1.21 | 1.42 | 1.46 | 1.05 | 0.57 |
| BCAA/Aromatic | 5.81 | 3.61 | 3.49 | 2.75 | 4.70 | 2.90 | 2.33 | 2.15 | 2.35 | 2.89 |
| Leu+Ile + Val (%) | 41.7 | 35.1 | 23.4 | 29.4 | 32.6 | 21.0 | 22.8 | 25.2 | 21.3 | 13.1 |
| Conditionally essential (%) | 17.3 | 20.1 | 22.7 | 20.4 | 25.1 | 24.2 | 24.7 | 29.6 | 38.8 | 63.6 |

Cost?

S. C. Madden and W. A. Clay. Protein metabolism and protein reserves during acute sterile inflammation: High protein intake compensates for increased catabolism. J.Exp.Med. 82 (1):65-76, 1945.

# The opportunity

Dipeptides in TPN were becoming fashionable

Peripheral parenteral nutrition was feasible

Advances in protein hydrolysate biotechnology

Measurement methods had improved

# Industry support

Was there!

# Institutional support

Was there

# The concept

Was there

Reduce contribution from major osmotic component

Reduce contribution from 2nd major osmotic component

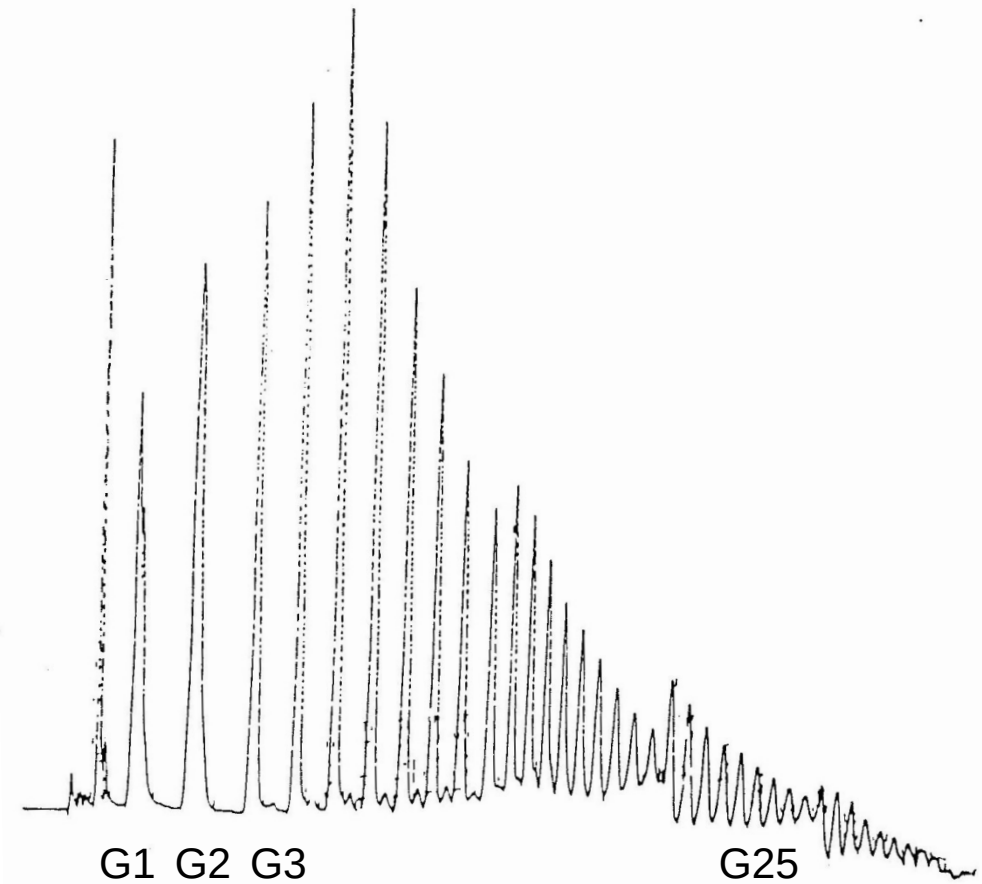
Use oligomeric substrates

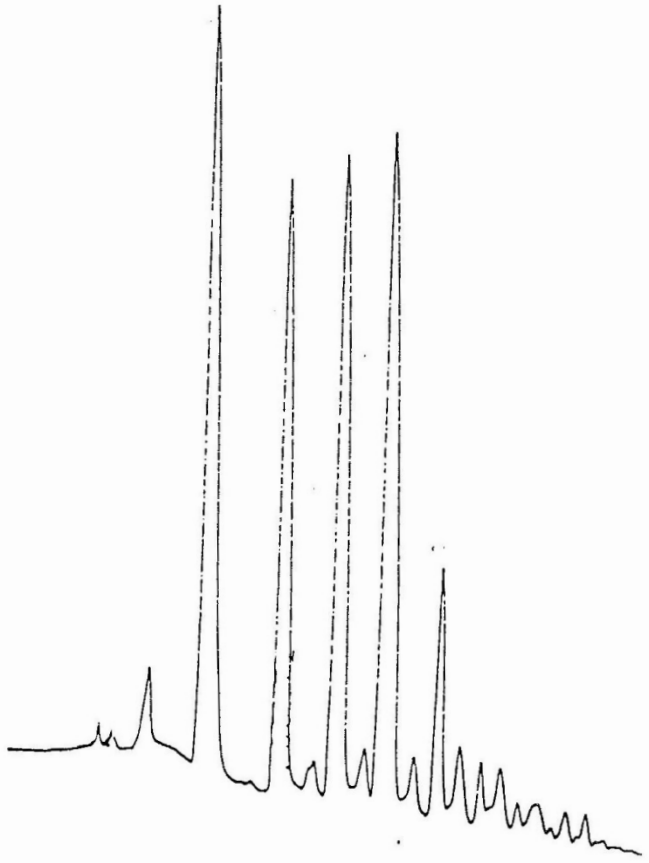
Use topical vasodilation


CHO
ENTERAL
Amino acid
Министерство мясной и молочной промышленности РСФСР
Загорский гормолзавод
цех медпрепаратов
Hydrolysatum caseini
ГИДРОЛИЗАТ КАЗЕИНА
СТЕРИЛЬНО
Вводить только капельным методом внутривенно, подкожно или внутрь через зонд.
Применяется для парентерального белкового питания
Серия 1041283
400 мл
Годен до XII-90
Хранить и транспортировать при t от —10 до +23°С
МИНИСТЕРСТВО ЗДРАВООХРАНЕНИЯ РСФСР
СТАНЦИЯ ПЕРЕЛИВАНИЯ КРОВИ ГУЗМ
АМИНОКРОВИН
AMINOCROVINUM
500 мл
СТЕРИЛЬНО
Вводить только капельно внутривенно, подкожно или через зонд в желудок или тонкий кишечник
Серия 330888
Годен до IX-91
Хранить при температуре от +4° до +20°
CH2.
Enteral


JOHNNIE WALKER
Red Label
Blended Scotch Whisky
Scotch Whisky Mélange
ESTABLISHED 1820
JOHN WALKER & SONS KILMARNOCK SCOTLAND

# Glucose – main contributor to osmolality



# Technical hurdles

**Characterising protein hydrolysates**
new method for α-$NH_2$
new Cu(II) method for distribution of chain-length
new method for sequencing hydrolysate
GC/HPLC-MS for identifying peptides

**Characterising glucose oligomers**
Ion-exchange HPLC

**Producing the stuff**


**In a form suitable for infusion into humans**

# Proof of Principle Studies

- TPN given to healthy volunteers – hydrolysate versus amino acids
- i.v. glucose given to healthy volunteers – glucose versus glucose oligomers

| | Excretion during monomer infusion (%) | Excretion during oligomer infusion (%) |
|---|---|---|
| Amino acids | 4.7 | 12.3 |
| Glucose | 0.17 ± 0.07 | 6.43 ± 0.83 |

# The one that got away?

SMART 1 and SMART 2 Awards to Helix Biotechnology

Identification of single enzymes which could liberate dipeptides and tripeptides

Technical success – commercial failure, but was it wasted?

RM 10682.

**PCT** WORLD INTELLECTUAL PROPERTY ORGANIZATION International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(71) Applicant (*for all designated States except US*): HELIX BIOTECHNOLOGY LTD. [GB/GB]; 182 Gloucester Place, London NW1 6DS (GB).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): ANDERSON, Jasen, Kingsley [AU/GB]; Helix Biotechnology Ltd., Darwin Building, Gower Street, London WC1E 6BT (GB). GRIMBLE, George, Kenneth [GB/GB]; Helix Biotechnology Ltd., Darwin Building, Gower Street, London WC1E 6BT (GB). COWAN, Donald, Arthur [NZ/GB]; Helix Biotechnology Ltd., Darwin Building, Gower Street, London WC1E 6BT (GB).

(74) Agents: SHEARD, Andrew, Gregory et al.; Kilburn & Strode, 30 John Street, London WC1N 2DD (GB).

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**Published**
*With international search report.*
*Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.*

(54) Title: THERMOSTABLE PROTEOLYTIC ENZYME FROM THERMOACTINOMYCES THALPOPHILUS THM1

(57) Abstract

A thermostable proteolytic enzyme which is producible by *Thermoactinomyces thalpophilus* THM1 (NCIMB 40778) and which: (a) has a pH optimum of about 8; (b) has a temperature optimum of about 70 °C; (c) is substantially inhibited by 1 mM phenylmethylsulphonylfluoride but substantially not inhibited by 10 mM dimethylsulphoxide, dithiothreitol or β-mercaptoethanol; (d) is at least partially dependent on the presence of calcium for its thermostability; and (e) is thermostable at 50 °C for at least 6 hours without substantial loss of activity, is useful in the preparation of protein hydrolysates for nutritional and clinical use.

Helix Biotechnology

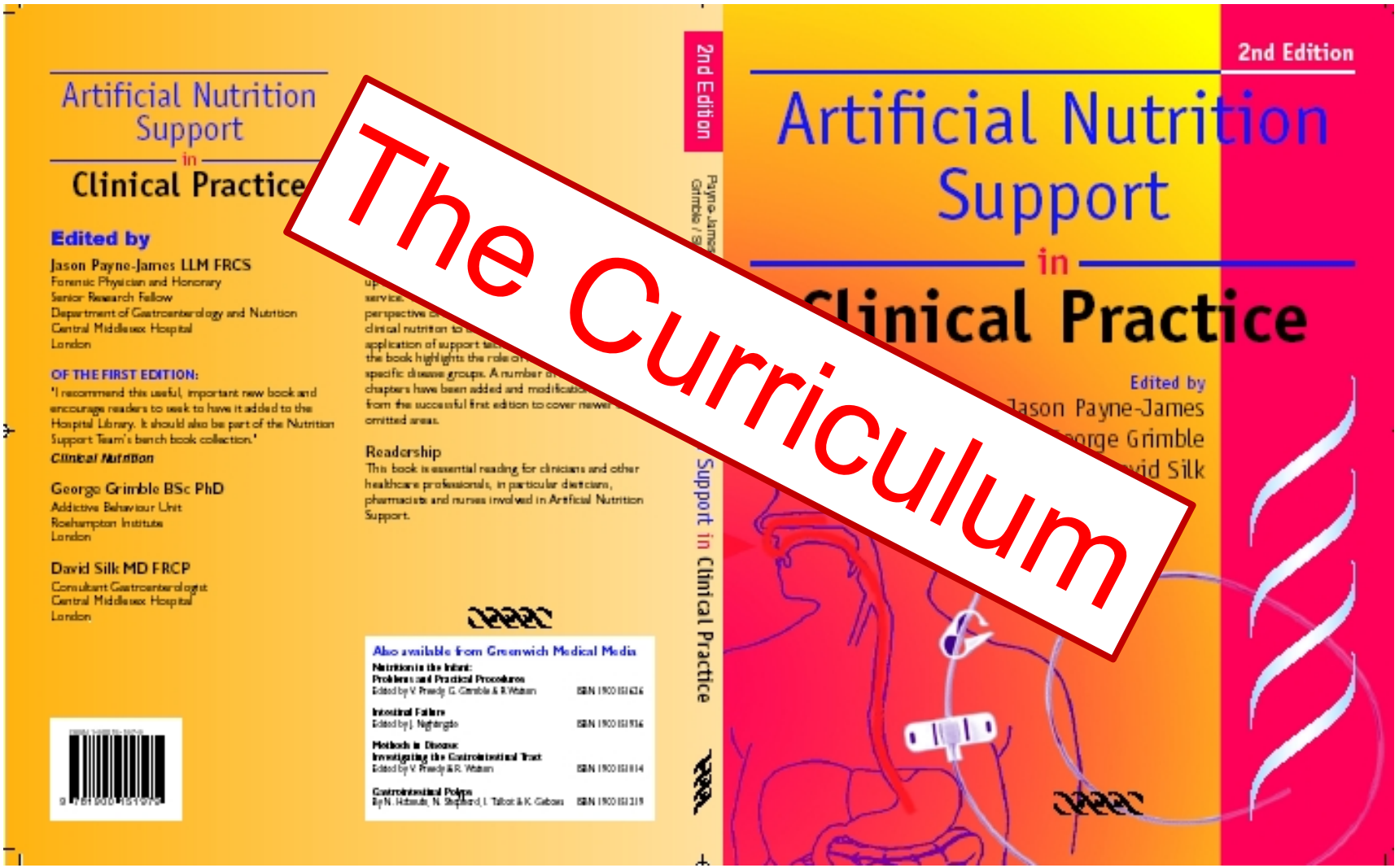
# A long career and many interests


## The Academic Stool

Concept – courtesy Dr Nigel Reeve*

* Hedgehogs. (1994) Nigel Reeve, T. & A.D. Poyser.

# Nothing is ever wasted



# Scholarship, research and …..education

Roehampton University London

First MSc in Clinical Nutrition to be established in Europe

# Nothing is ever wasted

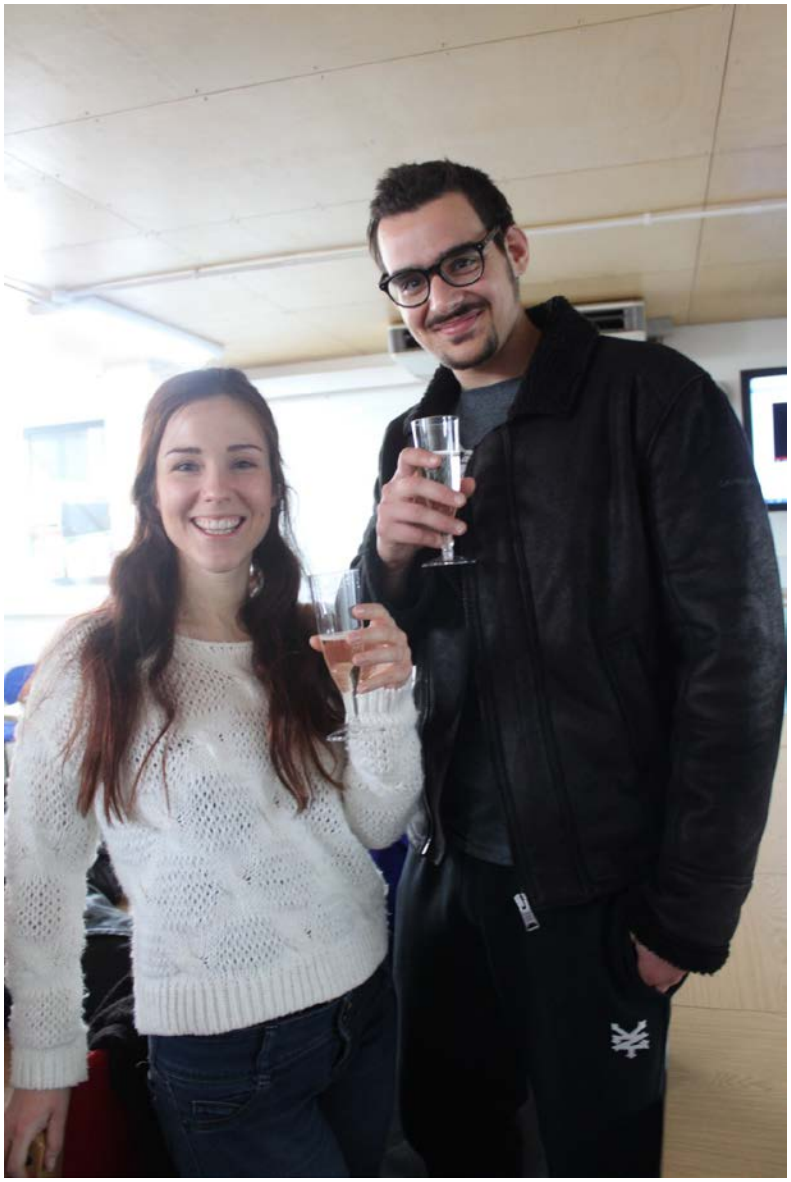
People losing or gaining weight and they can't help it

MSc in Clinical and Publi… …utrition

# Nothing is ever wasted

BAPEN

*Putting patients at the centre of good nutritional care*



MSc in Eating Disorders and Clinical Nutrition

# Working together in teams is best

## There is no “Nutrition Department” at UCL

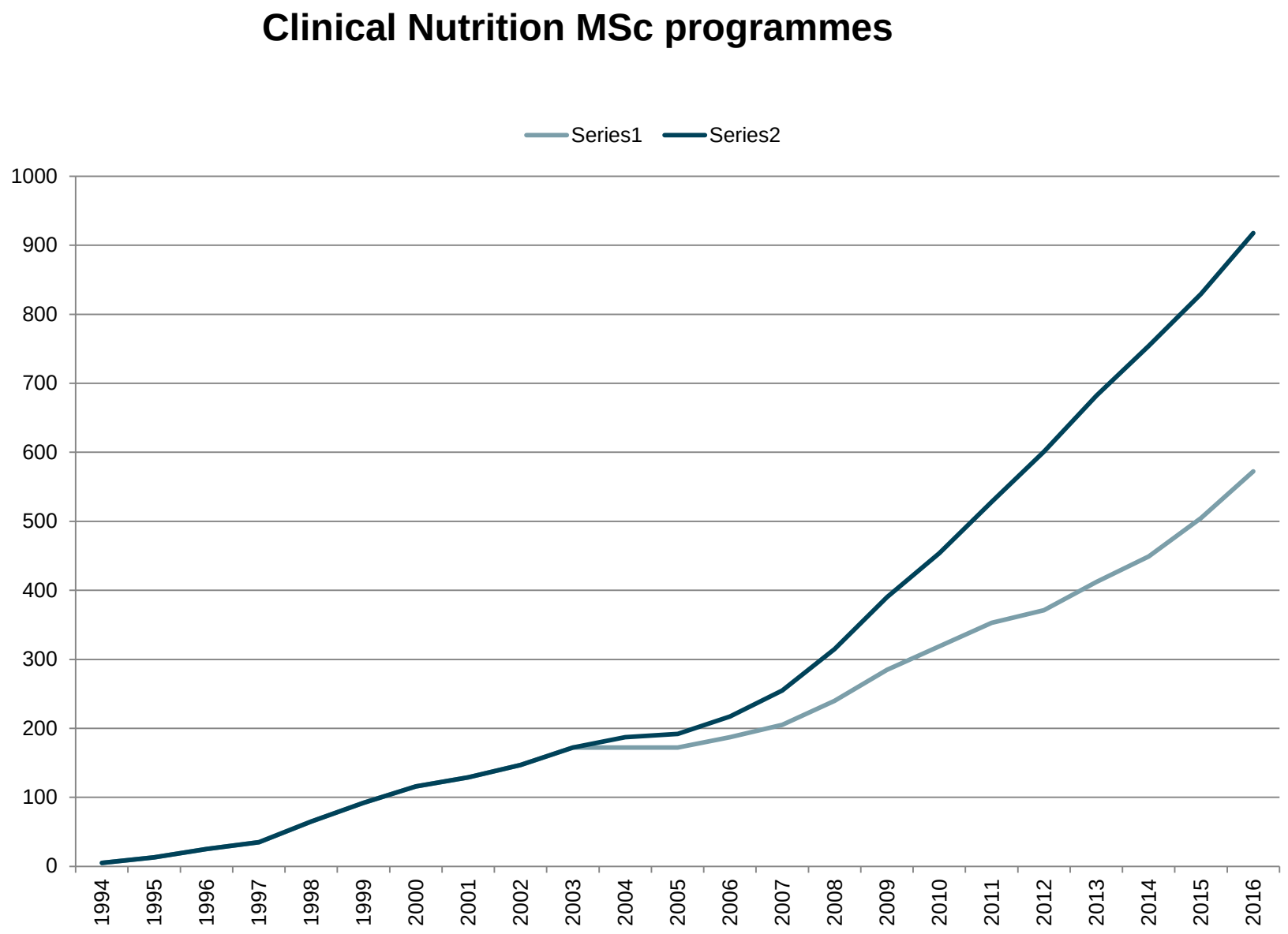
Course Tutors are subject experts
High lecture content – **120 lecturers in total**

*“Joined at the hip”* – share 6 modules

Teaching on 2 days/week only
Highly efficient structure - home part-time students can attend

Most projects take place outside the Division of Medicine (£1,000 each)

# Recruitment since 1994



# Sudden changes of direction are normal

# What piqued my interest in Food Poverty?

- *"The Patient's Journey"*
- *"Needs must"* for research projects
- Media involvement

# *"Needs must"* – UCL MSc students

*"Experimenters are the shock troops of science"*

Max Planck

# THE EFFECT OF A FRESH FRUIT AND VEGETABLE DELIVERY ON THE HEALTH AND INDEPENDENCE OF SENIORS

**Miryem Salah**[1]
Moisson Montréal, Canada

**George Grimble**[2]
University College London, (UCL), UK


Salah M, Grimble G. The effect of a fresh fruit and vegetable delivery on the health and independence of seniors. International Journal of Food, Nutrition and Public Health 2013;6(2):123-41.

# Media involvement


# Fibre and bowel function ont' telly


2012

# Fibre and bowel function ont' telly

The Food Hospital Fibre Challenge app for iPhone and Android devices.

It encouraged viewers to increase the amount of fibre in their diet for 21 days (+5g/day, +10g/day).

Participants recorded

- Bowel movements
- Stool type using the Bristol Stool Form Scale.
- Wellbeing

# Fibre and bowel function ont' telly

| Downloaded the app | Reported results at 1 week | Reported results at 3 weeks |
|---|---|---|
| 46,279 | 5,444 | 3,261 |

# Difference between those who responded to interim but not final and those who responded both interim and final

| Q2. How would you define the change in your bowel habits? | | | | | |
|---|---|---|---|---|---|
| | Interim only | | Interim+final | | |
| | N | % | N | % | TOTAL |
| Worsened | 58 | 2.2 | 26 | 1.0 | 84 |
| Slightly worse | 131 | 5.1 | 94 | 3.6 | 225 |
| Neutral | 768 | 29.6 | 666 | 25.4 | 1434 |
| Slightly better | 1282 | 49.4 | 1315 | 50.1 | 2597 |
| Much better | 356 | 13.7 | 526 | 20.0 | 882 |
| p=<0.001 | | | | | |

63.1%

70.1%

Courtesy Dr Hynek Pikhart

# Difference between those who responded to interim but not final and those who responded both interim and final

| Q3. How would you define the change in your general health? | | | | | |
|---|---|---|---|---|---|
| | Interim only | | Interim+final | | |
| | N | % | N | % | TOTAL |
| Worsened | 39 | 1.5 | 15 | 0.6 | 54 |
| Slightly worse | 103 | 4.0 | 80 | 3.0 | 183 |
| Neutral | 1587 | 61.2 | 2543 | 58.7 | 4130 |
| Slightly better | 724 | 27.9 | 805 | 30.6 | 1529 |
| Much better | 141 | 5.4 | 185 | 7.0 | 326 |
| p=<0.001 | | | | | |

33.3%

37.6%

Courtesy Dr Hynek Pikhart

# Was this a nutritional effect?

# MSc and PhD Projects 2012 - 2016

Can Fruits and Vegetables improve well-being in clients attending Foodbanks?

Who uses London Foodbanks and why do they attend?

How do clients cope with food insecurity and its impact on their dietary quality and health?

# How Foodbanks work in 2016

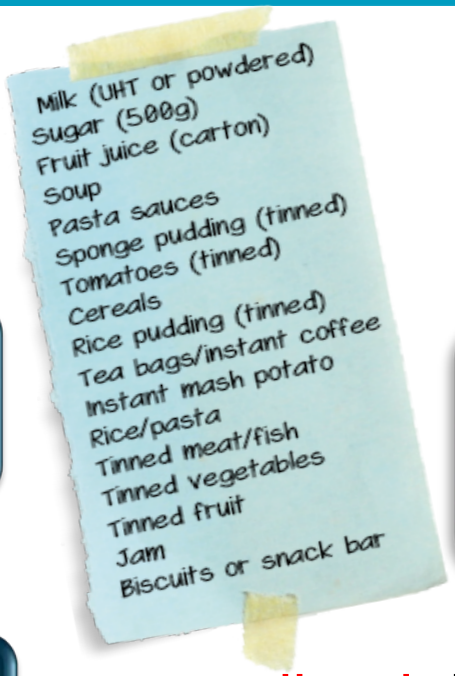
Food is donated

Food is sorted and stored in local distribution centres

Frontline care professionals identify people in need

Clients can receive 3 days worth food parcels (up to 3 vouchers per year)






network foodbank by trussell trust

Foodbank is run by the Trussell Trust charity for people in food crisis

*1,109,309* people received food parcels

*424* distribution centres in the UK

1. The Trussell Trust. link: http://www.trusselltrust.org/stats

# Methodology

**Design:** Qualitative - Semi-structured interviews

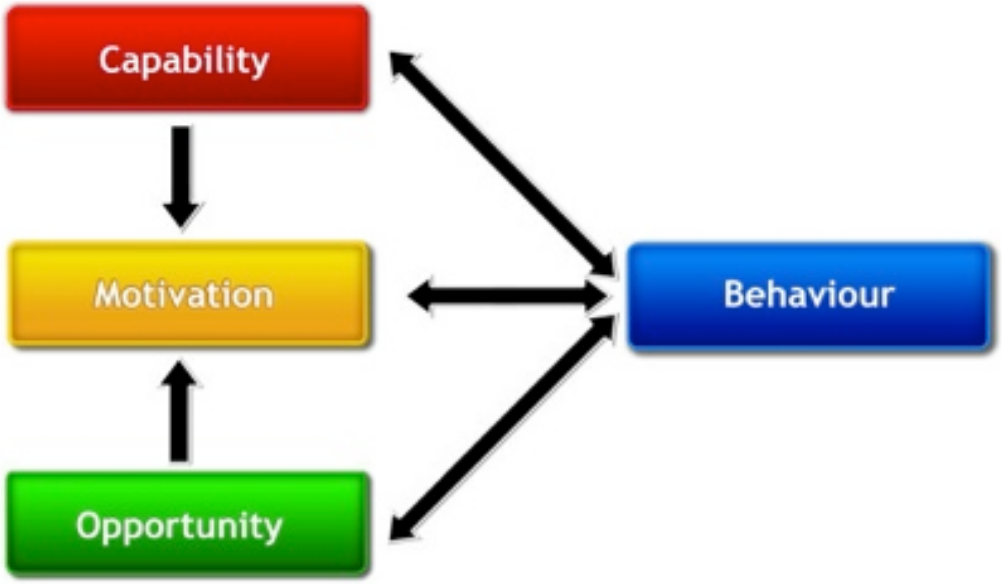
**Participants:** 18 Foodbank clients from 10 London centres.  Opportunistically recruited

Prayogo, Chater and Grimble - unpublished

# Methodology

- **Materials**
  - Demographic questionnaire
  - 6-Item USDA Food Security Module[2]

- **Theoretical framework: COM-B[3,4]**




2. Blumberg SJ, et al. (1999)
3. Cane J, et al. (2012)
4. Michie et al. (2011)

# Findings – Impact on psychological health

## Lack of food

*"It has been to the state when I am **suicidal** you know, I can't do this, I won't do it to the children, but, it got to the stage where, I am **no value**, you know, I feel **worthless**, makes you feel absolutely **worthless**…"*

(P10, Male, 44 years old with 4 children)

## Embarrassed and degraded

*"It is a.. a **shame** by the **stigma of the Foodbank** is for person that couldn't help themselves .. yeah.. that is the way how I am feeling.. but as a family or a Group.. yeah.. it is to feed my family and my children."*

(P3, Male, 48 years old with 5 children)

Prayogo, Chater and Grimble - unpublished

## Poor quality of food

*"I ate **fruit and vegetables** everyday when I was **working**. Normally I have chips once a week, once every fortnight, but when you are not work [ing] you tend to have them every day. […] I have to go to Iceland and spend £10 […] I have **sausage and chips every day for 2-weeks** which is not good for you, but it **is cheaper**"*

(P16, Male, 54 years old, single)

## Potentially harmful strategies

**Skipping meals**

I am supposed to eat every 4 hours, and **I've gone 3 days without eating** but I am coping with it, and get on with it.

(P10, Male, 44 years old with 4 children)

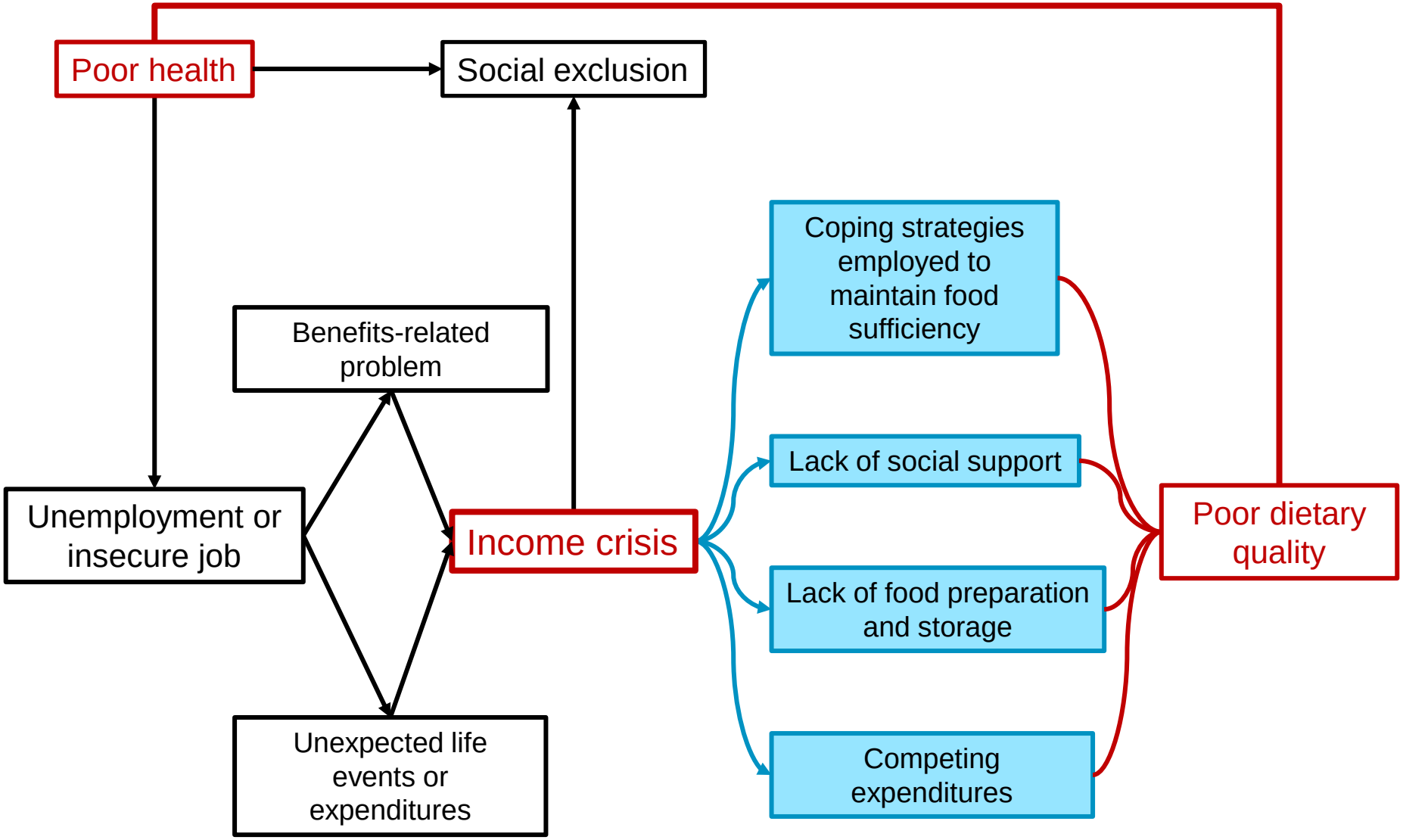
**Reducing other expenditures – 'Heat or Eat' trade-off**

"I cut down the heating, (….) we stayed in the dark most of the time"

(P12, Female, 45 years old with 3 children)

Prayogo, Chater and Grimble - unpublished

# Putting it all together




Prayogo, Chater, Barker and Grimble - unpublished

# Dietary quality in Foodbank clients

**A study comparing clients of Foodbanks and Neighbourhood Advice Centres**

| | |
|---|---|
| Brixton, West Norwood, Wandsworth, and Vauxhall foodbanks | Brixton Advice Centre, Wandsworth Citizen's Advice Bureau, Islington Law Centre |

**Dietary quality**

An 18-page structured questionnaire was developed to assess the dietary quality of clients using a 20-item food frequency questionnaire (FFQ)

**Health and lifestyle**

ONS 4-item wellbeing measure
Hospital anxiety and depression scale
General self-rated health (GSRH) scale
Multi-dimensional scale of perceived social support
USDA 10-item Food Insecurity Scale
Access to cooking and storage facilities

# Demographics of study participants

| Demographic | FB (n=272) | AC (n=245) | P Value | LIDNS (n=3728) | P Value inc. LIDNS |
|---|---|---|---|---|---|
| **Age in years** (mean (SD)) | 42.5 (11.1) | 44.8 (13.7) | P=0.05 | 40.6 (24.7) | P<0.05 |
| **Gender** | **n (%)** | **n (%)** | | **n (%)** | |
| Male | 121 (44.5) | 103 (42.0) | P=0.60 | 1384 (37.1) | P<0.05 |
| Female | 151 (55.5) | 142 (58.0) | | 2345 (62.9) | |
| **Ethnicity** | **n (%)** | **n (%)** | | **n (%)** | |
| Black | 107 (39.3) | 110 (44.9) | | 111 (3.0) | |
| White | 128 (47.1) | 93 (38.0) | P=0.21 | 3383 (90.7) | P<0.001 |
| Asian | 14 (5.1) | 16 (6.5) | | 140 (3.8) | |
| Mixed/Other | 23 (8.5) | 26 (10.6) | | 95 (2.5) | |
| **Marital Status** | **n (%)** | **n (%)** | | **n (%)** | |
| Married | 21 (7.7) | 31 (12.7) | | 698 (18.7) | |
| Cohabitating | 26 (9.6) | 17 (6.9) | P=0.07 | 219 (5.9) | P<0.001 |
| Single | 173 (63.6) | 137 (55.9) | | 1643 (44.1) | |
| Widowed, separated or divorced | 51 (18.8) | 59 (24.1) | | 1169 (31.3) | |
| **Unemployed** (%) | 238 (88.1) | 136 (55.5) | P<0.001 | 2454 (69.6) | P<0.001 |
| **Accommodation Status** | **n (%)** | **n (%)** | | | |
| Own outright or with mortgage | 3 (1.1) | 11 (4.5) | | | |
| Private rent | 33 (12.1) | 44 (18) | | | |
| Local authority / housing association | 170 (62.5) | 148 (60.4) | P<0.01 | - | - |
| Living with family or friends | 20 (7.4) | 24 (9.8) | | | |
| Homeless / temporary accommodation | 44 (16.2) | 17 (6.9) | | | |

Prayogo, Waterfall, Rahmawati and Grimble - unpublished

# Dietary quality in the groups

USDA Household Food Security Module

| Food Score | FB | AC | P Value | LIDNS | P Value including LIDNS |
|---|---|---|---|---|---|
| **Total HFSM score** (mean, SD) | 7.6 (2.7) | 4.0 (3.6) | P<0.001 | 1.9 (2.7) | P<0.001 |
| **Fruit g/day** (mean, SD) | 45.9 (75.0) | 92.7 (104.7) | P<0.001 | 57.5 (84.8) | P<0.001 |
| **Vegetables g/day** (mean, SD) | 95.4 (135.6) | 149.0 (133.0) | P<0.001 | 97.9 (80.7) | P<0.001 |
| **Oily fish g/day** (mean, SD) | 13.4 (17.2) | 20.1 (21.9) | P<0.001 | 6.7 (19.7) | P<0.001 |
| **Fat g/day** (mean, SD) | 112.9 (139.1) | 90.8 (76.0) | P<0.05 | 68.6 (30.0) | P<0.001 |
| **NMES g/day** (mean, SD) | 68.5 (68.5) | 64.1 (53.0) | P=0.42 | 67.1 (48.3) | P=0.60 |

Prayogo, Waterfall, Rahmawati and Grimble - unpublished

# Graduate students are the shock troops - for pilot studies!

“Preoperative nutritional factors in enterocutaneous fistula patients as a predictor of morbidity” Sara Ajabnoor MSc 2013-14

“The effectiveness of Modified Ketogenic Diet Therapy in adults with drug resistant epilepsy following the initial 3 months trial” Danae Papangelis MSc 2015-16

# Kulturkampf = Culture War

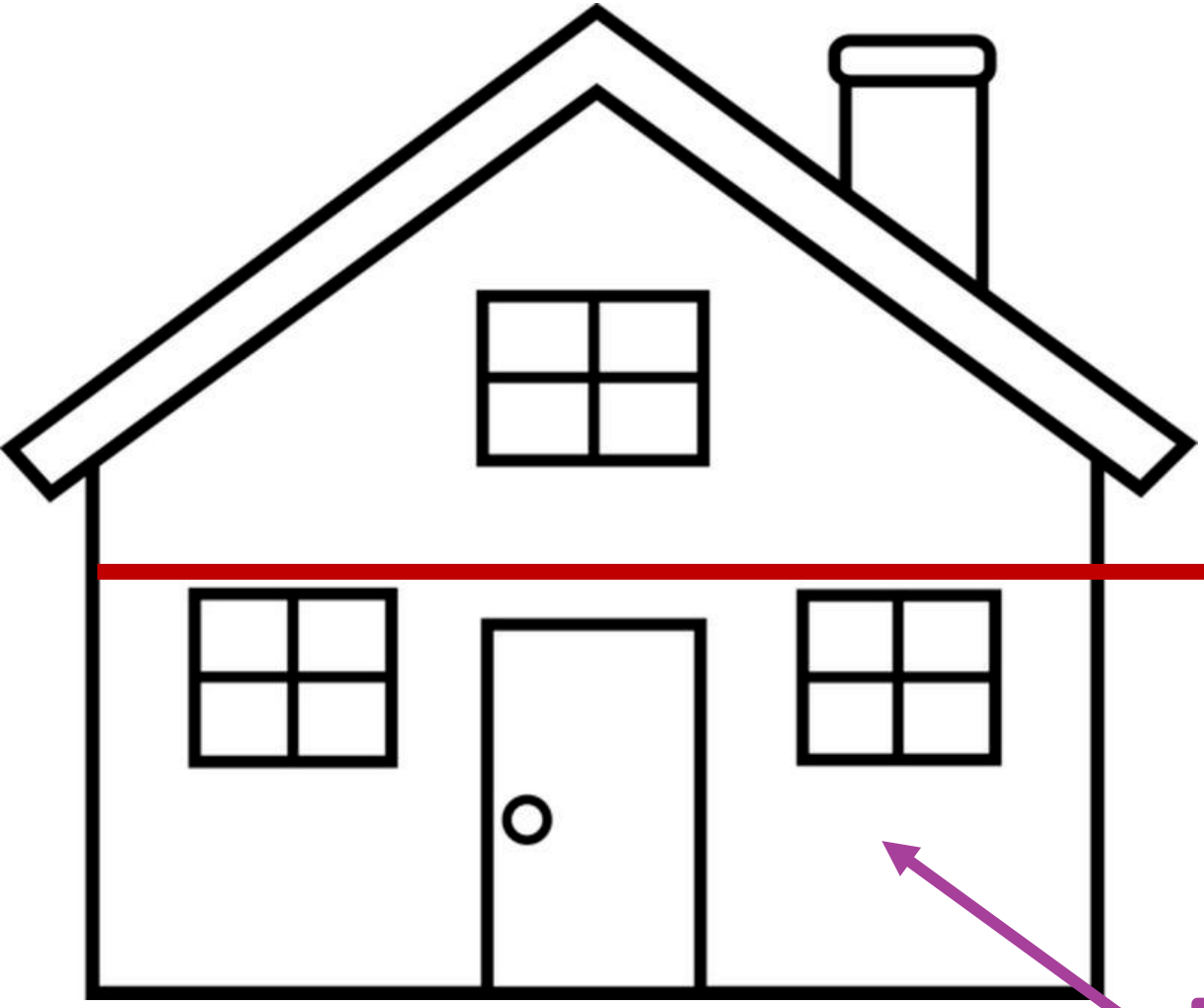
In the USA and the UK, *"The Culture Wars"* refers to a conflict between traditionalist or conservative values and progressive or liberal values.

# Kulturkampf = Culture War

What are the claims of truth in our culture?

# Know why you're doing what you're doing

## The materialist understanding of reality



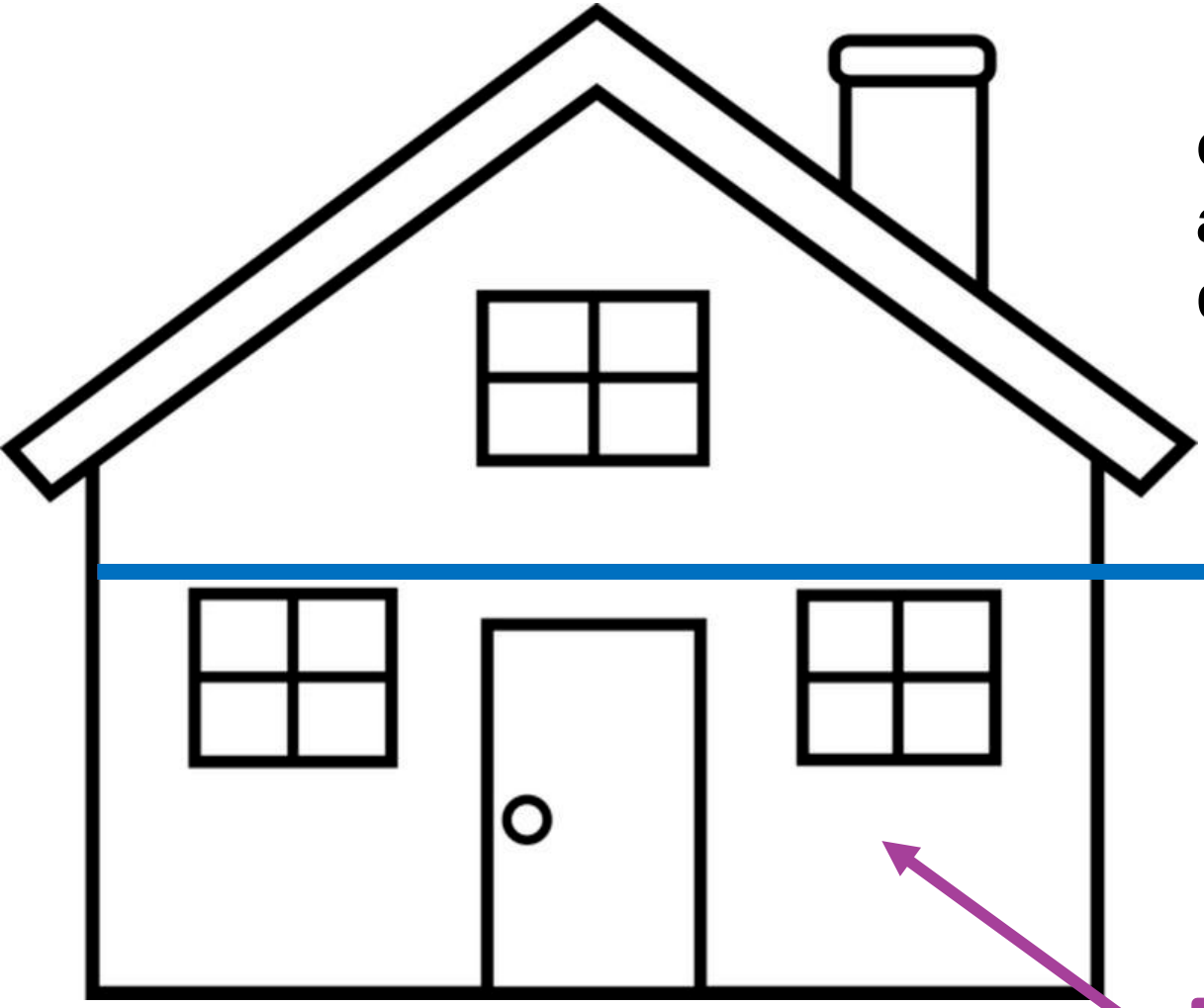
**noncognitive stuff that gives life meaning, ultimately nonrational, deeply personal and incapable of being judged or assessed by third parties**

**cognitive stuff that counts as real knowledge: science, reason, data**

Not my house

# Know why you're doing what you're doing

## The theological understanding of reality



**cognitive stuff such as: science, reason, data**

**truth that gives life meaning, ground of truth**

My house

# Know why you're doing what you're doing

## A comedian's understanding of reality


*"I would like 2016 to be the year when people remembered that science is a method of investigation, and NOT a belief system"*

John Cleese

# Know why you’re doing what you’re doing

# Nothing is ever wasted

0148-6071/88/1201-0100$02.00/0
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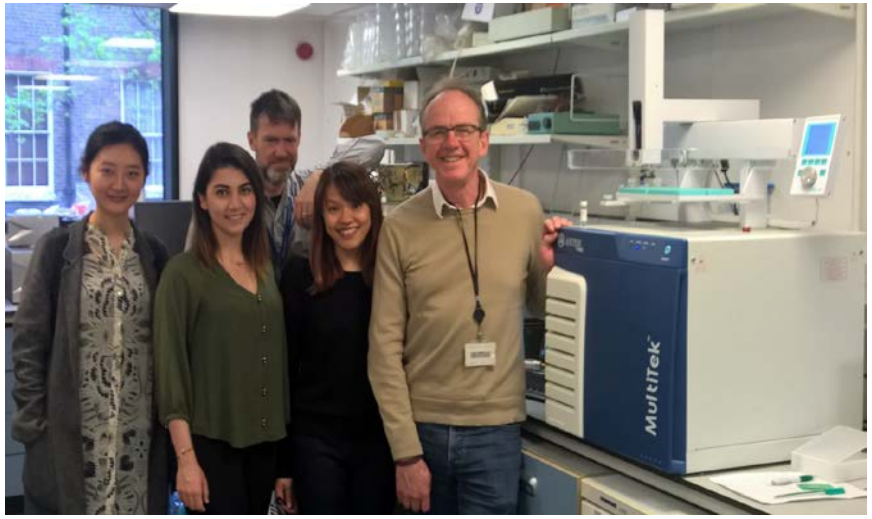
## Assessment of an Automated Chemiluminescence Nitrogen Analyzer for Routine Use in Clinical Nutrition

GEORGE K. GRIMBLE, B.SC. PH.D., MALCOLM F. E. WEST, M.SC., F.I.M.L.S.,
ALDO B. C. ACUTI, B.SC., A.I.M.L.S., ROGER G. REES, B.MED.SC., M.R.C.P.,
MANJIT K. HUNJAN, M.SC., PH.D., JOAN D. WEBSTER,* B.SC., PETER G. FROST, M.SC., M.R.C.PATH., AND
DAVID B. A. SILK, M.D., F.R.C.P.

*From the Departments of Gastroenterology and Nutrition and Chemical Pathology, Central Middlesex Hospital, London, and Nutrition Research Group, Clinical Research Centre, Harrow, Middlesex, England*



# Acknowledgements

Too many to cite, alas, but you know who you are!

# Thank you for your attention