Digestive enzyme supplements: replacement therapy for individuals unwilling to take porcine products

Sir,

The core treatment for pancreatic failure is porcine pancreatic enzyme supplements. This presents difficulties for vegetarians and vegans, Muslims, Jews, Seventh Day Adventists and Hindus. Although medical necessity means some will feel at ease with their use, this is not always so. There are no approved alternatives, but some patients report success with digestive enzyme supplements.

The internet was trawled for digestive enzyme supplements available from British sites during June 2014. Search terms were 'digestive enzymes' and 'natural enzymes'. Sites were examined to confirm products were for human consumption and said to aid digestion. Contents were noted, as well as suitability for vegetarians or vegans and if halal or kosher. The cost of a 28-day course based on three meals a day was estimated.

Thirty six products were identified (*Table 1*). Nineteen were suitable for vegetarians, but only one was halal and kosher. The cost of 1 month of treatment ranged from £6 to £196, with an average of £24 (*Table 1*). Direct comparison of the efficacy of products is limited by the fact that enzyme activity is often measured in different units (*Table 2* – available online at www.magonlinelibrary.com/toc/hmed/current). However, most contained lipase, protease, amylase and papain. Lipase, amylase and protease are the main constituents in licensed preparations and some digestive supplements would appear to have comparable levels of activity.

When 'life saving' therapy is not accepted by patients with serious conditions the lack of availability of alternative products increases the difficulty. For the clinician there is a dilemma as to whether such unlicensed products should be discussed, especially when there is limited objective research on their effectiveness.

In 1997 Rachman identified some potential advantages. A lipase derived from fermentation by *Aspergillus* possessed high stability and activity throughout a wide range of pH conditions (Griffin et al, 1989). In a cross-over study of acid-stable microbial lipase and two pancreatins

Table 1. Digestive enzyme supplements: cost and suitability for vegetarians

Name	Manufacturer	Cost *	Suitable for vegetarians
Digestabs	Puritan's Pride	£6.16	×
Zygest 13 Multi-enzyme	Puritan's Pride	£11.67	√
Multi-enzyme Formula	Puritan's Pride	£6.72	×
Super strength Multi-enzyme	Puritan's Pride	£9.45	×
Digestizyme	Nature's Best	£11.24	√
Digest Plus	Health Plus	£19.46	√
Enzyme Digest	Quest	£10.27	√
Udo's Choice Ultimate Digestive Enzyme Blend	Udo's Choice	£22.77	√
Best Digestive Enzymes	Doctor's Best	£16.79	√
Solaray Super Digestaway	Solaray	£18.20	×
Solaray Supadigestaway Plant Enzymes	Solaray	£25.20	
Solaray Vegan Enzymes	Solaray	£18.20	√
Life Extension Enhanced Super Digestive Enzyme	Life Extension	£14.25	√
Life Extension extra-ordinary enzymes	Life extension	£28.00	× contains porcine enzymes
Super Digestive Enzymes	Life Extension	£21.00	
Now Super Enzymes	Now	£8.87	×
Essential Enzymes	Source Naturals	£5.95	Vegetarian capsules available
Digestizyme	Lamberts	£22.26	√
Nature's Aid Digestive Enzyme	Nature's Aid	£19.32	√
Comfort Zone Digestive Complex Vegetable Capsules	Solgar	£11.20	× but kosher and halal
Vegan Digestive Enzymes	Solgar	£11.23	√
Digesti-zyme Daily 200 Tablets	Lindens	£5.04	√
Digeston	Health Aid	£17.95	Not stated
Digestiveaid	Specialist Supplements	£34.80	Not stated
Digestaid	Dr. Natura	£196.00	√
Digestive Enzyme Supplement	Nova	£35.06	√
Harmonie	Elle Belle UK	£50.37	√
Total Digest Support	Silvertown Health	£39.12	√
Digest Gold	Enzymedica	£35.83	Not stated
Digest	Enzymedica	£11.59	Not stated
Digestive enzymes	Swanson	£10.50	×
Biocare Lipozyme	BioCare	£14.31	√
Bioenzyme	BioCare	£22.26	√
Spectrumzyme	BioCare	£18.67	Not stated
Digestive Enzymes	Mercola	£28.00	×
Cytozyme	Cytoplan	£20.15	√

*Cost is of 28 days treatment

17 patients with pancreatic insufficiency and steatorrhoea all became symptom free on all three treatments (Schneider et al, 1985).

For many such patients, supplements are the only method for dealing with the ethical dilemma they face with porcine products. In addition 77% of religious leaders said patients should be informed of the constituents of products, and a consequence of failure was successful litigation (Enoch et al, 2005).

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Enoch S, Shaaban H, Dunn KW (2005) Informed consent should be obtained from patients to use products (skin substitutes) and dressings containing biological material. *J Med Ethics* **31**: 2–6

Griffin SM, Alderson D, Farndon JR (1989) Acid resistant lipase as replacement therapy in chronic pancreatic exocrine insufficiency: a study in dogs. *Gut* **30**: 1012–15

Rachman B (1997) Unique features and application of non-animal derived enzymes. *Clinical Nutrition Insights* **5**: 1–4

Schneider MU, Knoll-Ruzicka ML, Domscke S, Heptner G, Domschke W (1985) Pancreatic enzyme replacement therapy: comparative effects of conventional and enteric-coated microspheric pancreatin and acid-stable fungal enzyme preparations on steatorrhea in chronic pancreatitis. *Hepato-gastroenterology* **32**: 97–102

Echocardiography training for non-cardiologists

Sir,

I read the article on 'Echocardiography training for non-cardiologists' (vol 75(6), 2014, p. 346) with interest. Being an acute medicine trainee with ultrasound as special skill many of the clinical and administrative points made by the authors resonated with me.

While there is no doubt that focussed bedside echocardiography is life saving in experienced hands, being able to get appropriate certification is a frustrating and demanding process.

There is a simpler route to gain level 1 ultrasound certification – via the College of Emergency Medicine (details can be found at www.collemergencymed.ac.uk/Training-Exams/Training/Ultrasound%20training). The trainee completes online 'enlighten me' modules to fulfil the theoretical requirement, attends a level 1 ultrasound course, completes 10 pictorial case reports as part of his/her reflective practice and then appears for the practical assessment alongside the emergency medicine trainees for 1:1 assessment on four level 1 modules (aortic scanning, echocardiography in life support, ultrasound-guided vascular access and FAST scan). It is free as long as it is done through proper channels via the regional College of Emergency Medicine supervisor, as there is funding available with most deaneries from the College of Emergency Medicine.

Echocardiography in life support is a limited echocardiogram used in the setting of non-shockable cardiac arrest rhythms (pulseless electrical activity and asystole). The heart is interrogated during a cardiopulmonary resuscitation rhythm to check for wall motion and treatable causes of pulseless electrical activity (cardiac tamponade, hypovolaemia and pulmonary embolism). The subxiphoid or the parasternal long axis views are used. In addition, the longitudinal subxiphoid view allows visualization of the inferior vena cava for assessment of diameter and collapsibility (Breitkreutz et al, 2007).

I achieved level 1 College of Emergency Medicine certification in the third year of my acute medicine training programme and am currently working towards College of Emergency Medicine level 2 (intermediate practitioner) by selecting three higher ultrasound specialities (cardiac, shock and lung) from an approved list on the College of Emergency Medicine website. The trainee's evidence (log book, reflective practice, supervised assessments) has to be presented to the regional College of Emergency Medicine supervisor and there is another practical assessment before level 2 sign off.

The major problem in this process is to find College of Emergency Medicine-approved supervisors to assess the selected level 2 modules. A person doing a regional pleural disease clinic performing multiple chest ultrasounds or an intensivist performing bedside scans on critical patients cannot assess the trainee if they have not submitted their qualifications to the College of Emergency Medicine.

My advice to the trainee looking to adopt this extremely useful skill as a part of their clinical repertoire is that initiative and regular practice in your day job, however minor it might be, will go a long way in establishing the ground work for a formal assessment from the College of Emergency Medicine. You might avoid paying hundreds of pounds for commercial courses and learn more tricks by doing it this way.

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Breitkreutz R, Walcher F, Seeger FH (2007) Focused echocardiographic evaluation in resuscitation management: Concept of an advanced life support-conformed algorithm. *Crit Care Med* **15**(Suppl 5): S150–S161

Table 2. Reported composition of non-animal derived digestive enzyme supplements

Name	Amylase	Papain	Betaine hydrochloride	Protease	Lipase	Bromelain
Digestabs	260 mg		130 mg			
Zygest 13 Multi-enzyme	25000 DU	500000 PU		100000 HUT	3750 FIP	500000 PU
Multi-enzyme Formula	100 mg	50 mg	100 mg	15 mg	25 mg	50 mg
Super strength Multi-enzyme	200 mg	100 mg		200 mg	50 mg	100 mg
Digestizyme	5000 DU	50000 PU		1000	313 FIP	12000 PU
Digest Plus	5400 units			1350 units	225 units	
Enzyme Digest		4.17 mg	100 mg		5.56 mg	5 mg
Udo's Choice Ultimate Digestive Enzyme Blend	5000 DU (55 mg)			12500 HUT (5 mg)	150 LU (25 mg)	50 000 PU (2 mg)
Best Digestive Enzymes	20000 DU	500000 FCC PU		95000 HUT	3000 FIP	
Solaray Super Digestaway	17500 units	50 mg	25 mg	17500 units	1400 units	150 GDU/g
Solaray Supadigestaway Plant Enzymes	25000 DU			75000 HUT	4000 FIP	
Solaray Vegan Enzymes	10100 DU	75000 PU		7050 HUT	60 LU	64000 PU
Life Extension Enhanced Super Digestive Enzymes	11600 FCC			24180 HUT	6400 FCC (DU)	
Life Extension Extra-ordinary Enzymes				97000 HUT	4000 FIP	
Super Digestive Enzymes	25000 FCC			√	16000 FCC	
Now Super Enzymes	20000 USP	100000 FCPU	200 mg	20000 USP	1600 USP	120 GDU
Essential Enzymes	630 FCC			785 FCC	375 FCC	
Digestizyme	5000 DU	50000 PU		10000 HUT	313 FIP	120000 PU
Nature's Aid Digestive Enzyme	6000 units		100 mg	4000 HUT	7000 units	
Comfort Zone Digestive Complex Vegetable Capsules	12500 DU	100 000 PU		50000 HUT	1000 FIP	100 000 PU
Vegan Digestive Enzymes	40 mg			15 mg	50 mg	
Digesti-zyme Daily 200 Tablets	100 mg	15 mg	250 mg		10 mg	
Digeston	10 mg	80 mg	100 mg	10 mg		50 mg
Digestiveaid	45 mg	50 mg	100 mg	50 mg	40 mg	75 mg
Digestaid	5000 DU	12000 PU		25000 HUT	1500 FIP	10000 FCC
Digestive Enzyme Supplement	45 mg	50 mg	100 mg	50 mg	40 mg	75 mg
Harmonie	45 mg	50 mg	100 mg	50 mg	40 mg	75 mg
Total Digest Support	45 mg	50 mg	100 mg	50 mg	40 mg	75 mg
Digest Gold	23000 DU			80 000 HUT	35 000 FCCFIP	
Digest	12000 DU			42 000 HUT	500 FCCFIP	
Digestive Enzymes		30 mg	5 mg			10 mg
Biocare Lipozyme					40 mg	
Bioenzyme	1.5 mg	30 mg		15 mg	4.88 mg	18 mg
Spectrumzyme	1.5 mg	9 mg		10.25 mg	4.8 mg	76.5 mg
Digestive Enzymes	1000 skb	100 mg				3000 mcu
Cytozyme		50 mg	75 mg	1000 HUT	203 FIP	100 mg

DU = dextrinising unit; FCC = Food Chemical Codex; FIP = lipase unit; HUT = haemoglobin unit on a tyrosine base; LU = lipase unit; PU = papain unit; Skb = Sandstedt–Kneen–Blish units; USP = United States Pharmacopeia