

ESMO Symposium “Nutrition and Cancer”

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Managing the catabolic drive: the role of anticancer treatments and anti-inflammatory agents

Alessandro Laviano, MD

DIPARTIMENTO
DI MEDICINA CLINICA



SAPIENZA
UNIVERSITÀ DI ROMA



alessandro.laviano@uniroma1.it

Palliative Effect of Chemotherapy: Objective Tumor Response Is Associated With Symptom Improvement in Patients With Metastatic Breast Cancer

By Paul Geels, Elizabeth Eisenhauer, Andrea Bezjak, Benny Zee, and Andrew Day

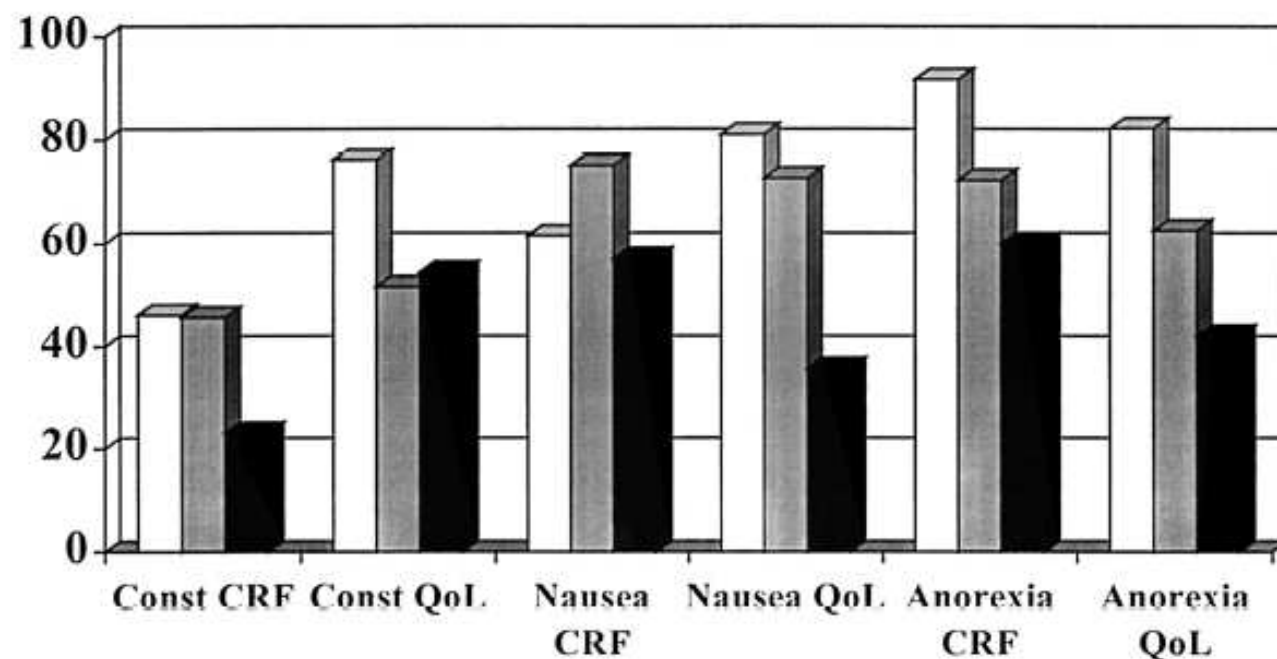
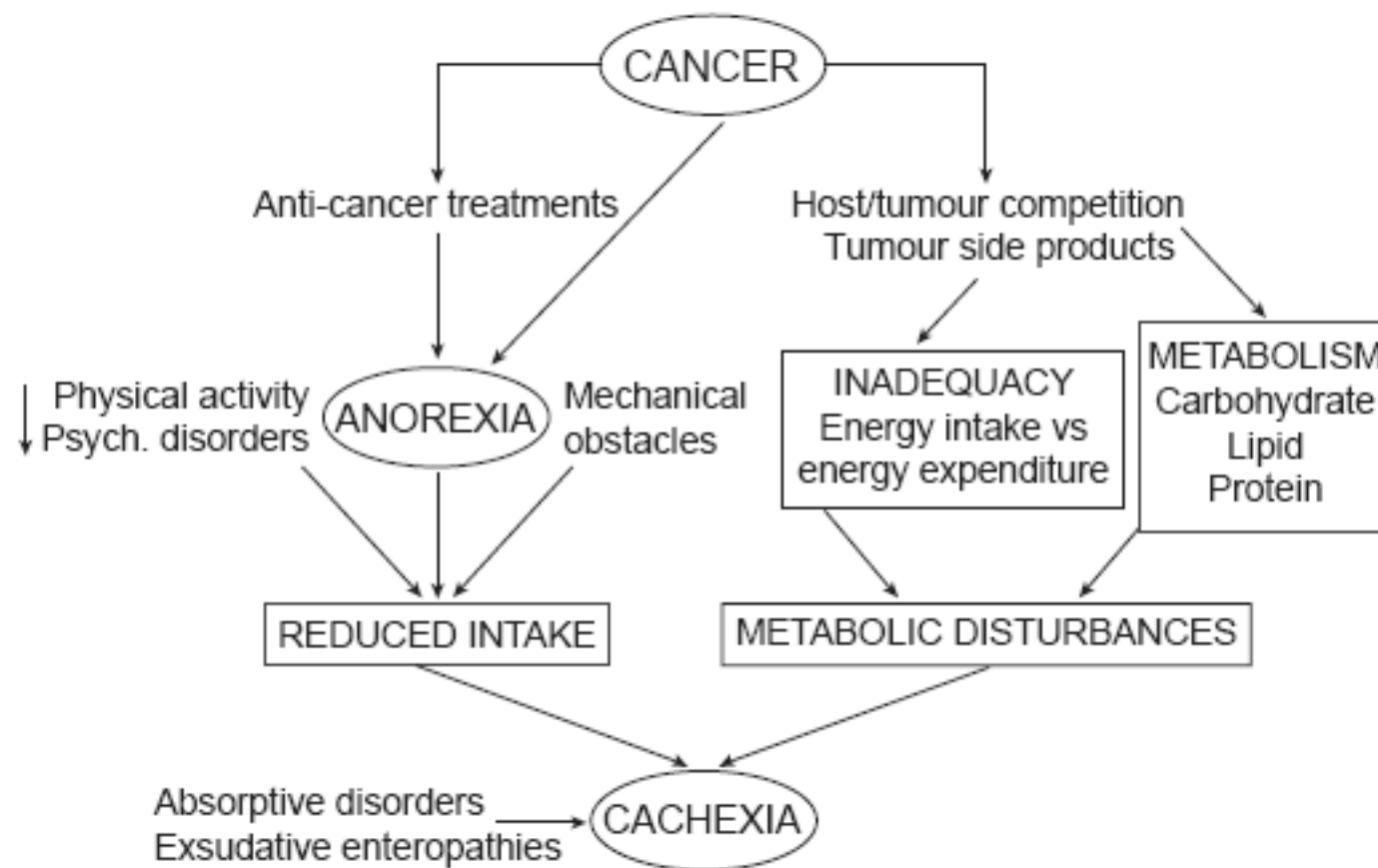


Fig 3. Proportion of patients with symptom response according to each objective response category: significant results only with QoL data. Const, constipation. □, CR/PR; ■, SD; ■, PD.



A prospective study on weight loss and energy intake in patients with head and neck cancer, during diagnosis, treatment and revalidation

M.G.A. van den Berg^{a,*}, E.L. Rasmussen-Conrad^a, G.M. Gwasara^a,
P.F.M. Krabbe^b, A.H.J. Naber^{c,d}, M.A. Merks^e

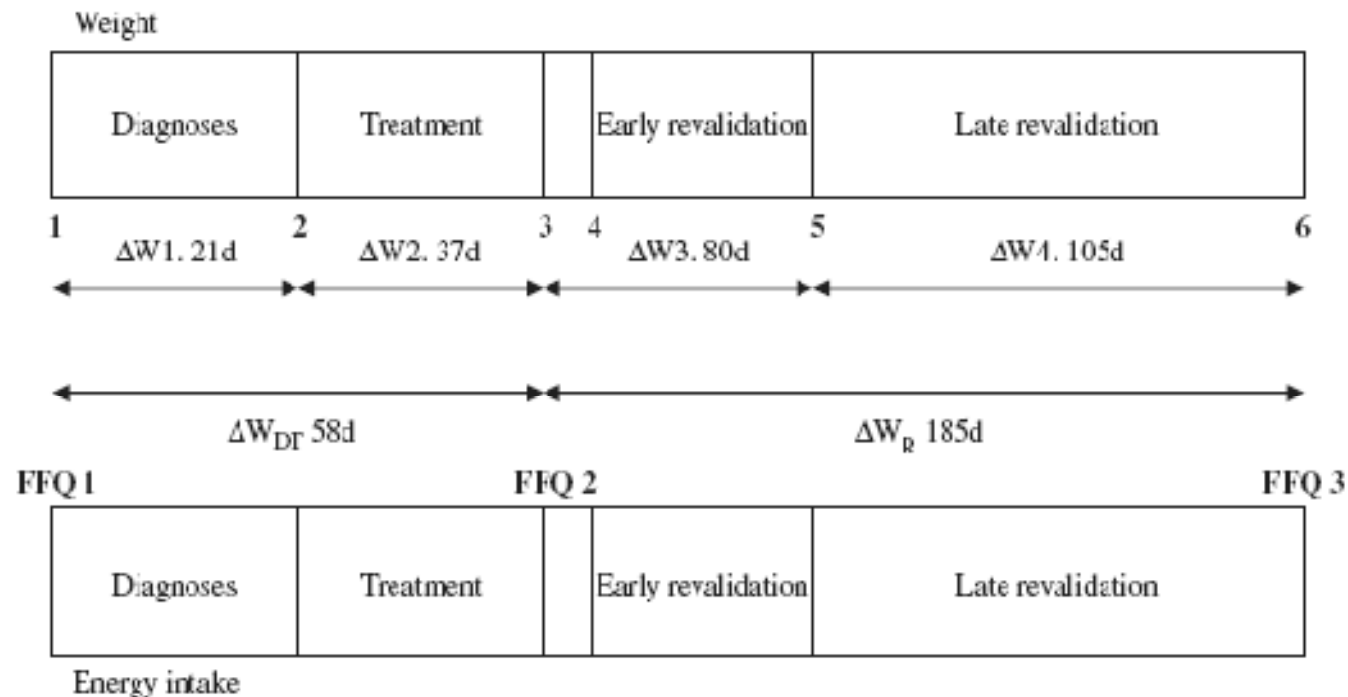


Figure 1 Study design: Weight⁽¹⁻⁶⁾ and energy intake (FFQ1–FFQ3) measurements during diagnosis, treatment and revalidation. ΔW = time period between measurements, d = mean days between screening.

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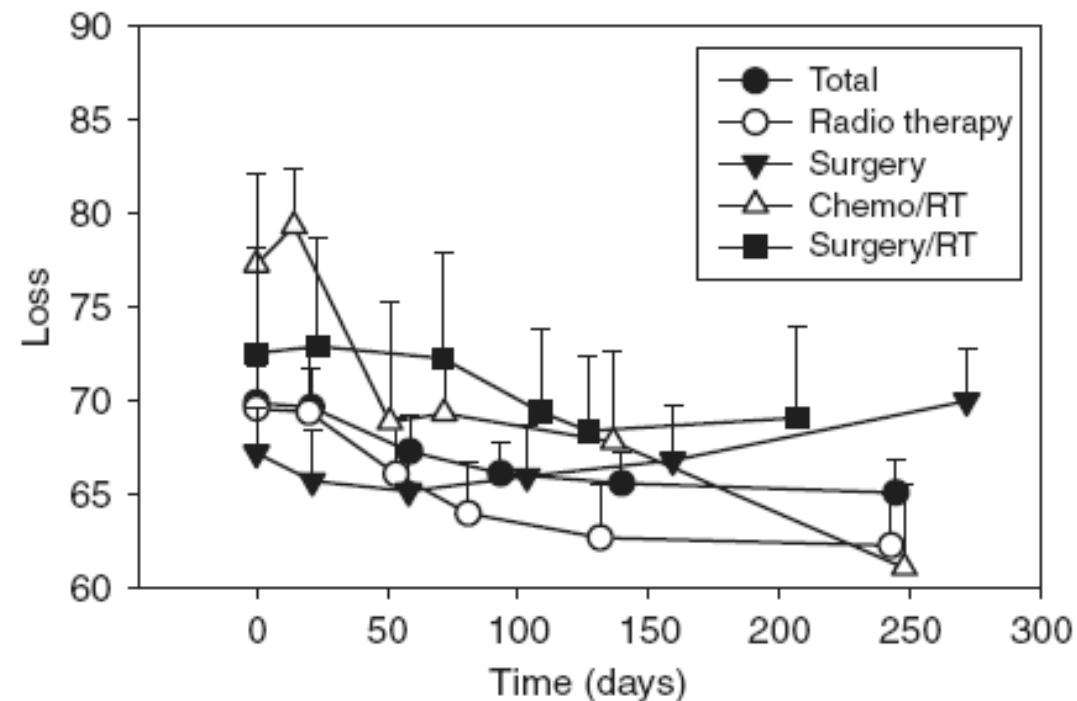


Figure 3 Mean (SD) weight change in kg during diagnoses treatment and revalidation by treatment therapy in time.

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Table 4 Energy in kcal/kg bodyweight (SD) for each treatment modality during diagnoses, treatment and revalidation.

Energy intake (kcal) per kg bodyweight per measurement	Total (n = 47)	Radiotherapy (n = 19)	Surgery (n = 15)	Chemo/Rad (n = 3)	Sur/Rad (n = 10)
FFQ1/Weight 1	32 ± 11	35 ± 12	28 ± 10	33 ± 13	33 ± 10
FFQ2/Weight 3	32 ± 11	33 ± 11	29 ± 11	19 ± 8	37 ± 9
FFQ3/Weight 6	38 ± 16	43 ± 18	31 ± 11	37 ± 29	39 ± 11

Temporal pattern of anorexia, diarrhea, weight loss, in patients with cervical cancer

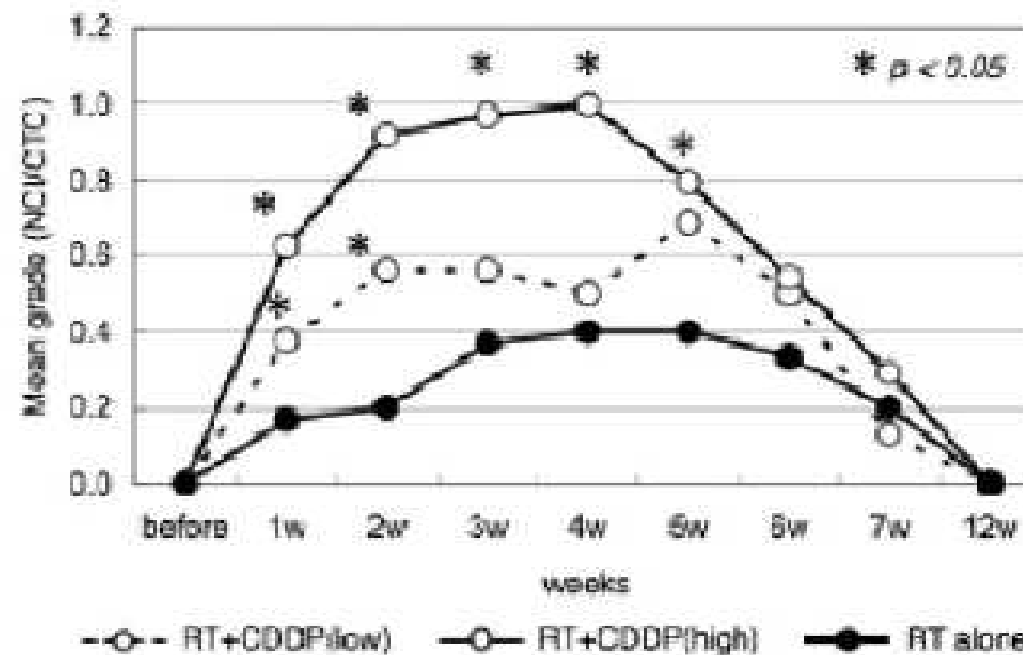
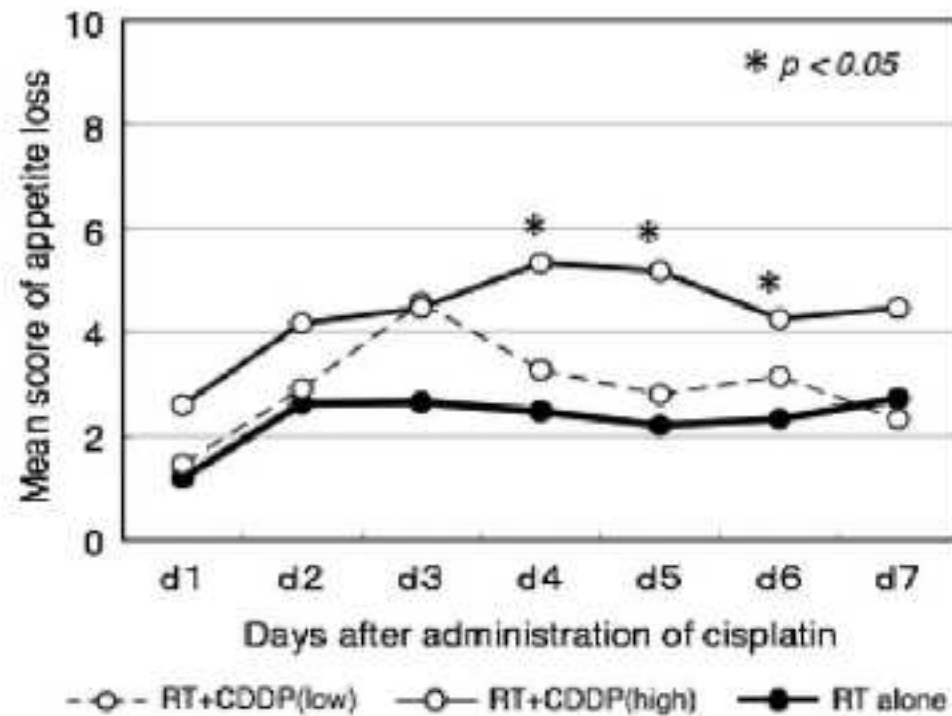
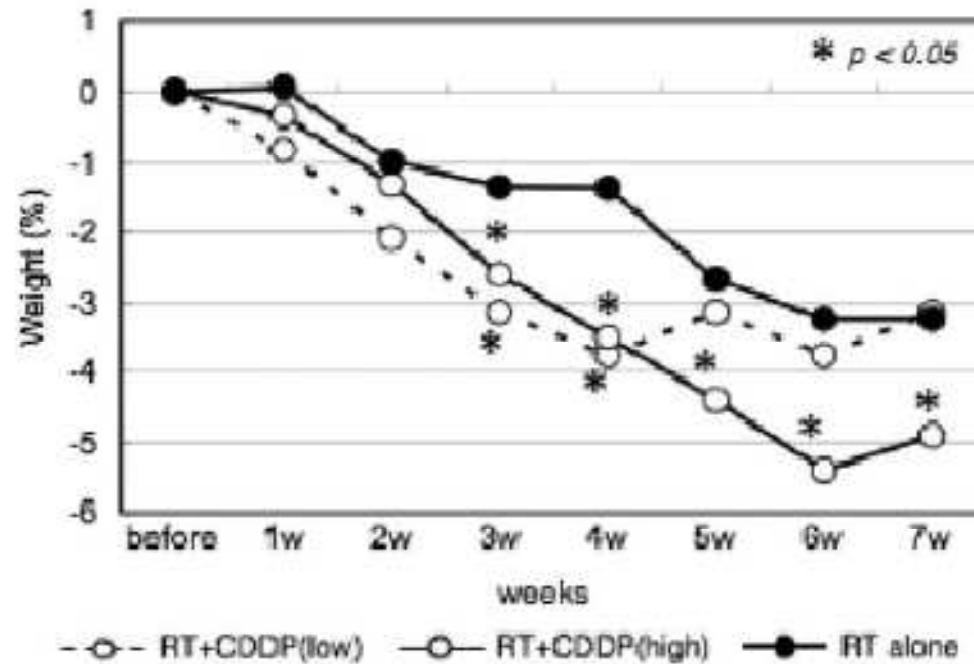


Fig. 1. Temporal patterns of anorexia in chemoradiation therapy compared with RT alone.

Temporal pattern of anorexia, diarrhea, weight loss, in patients with cervical cancer



Temporal pattern of anorexia, diarrhea, weight loss, in patients with cervical cancer

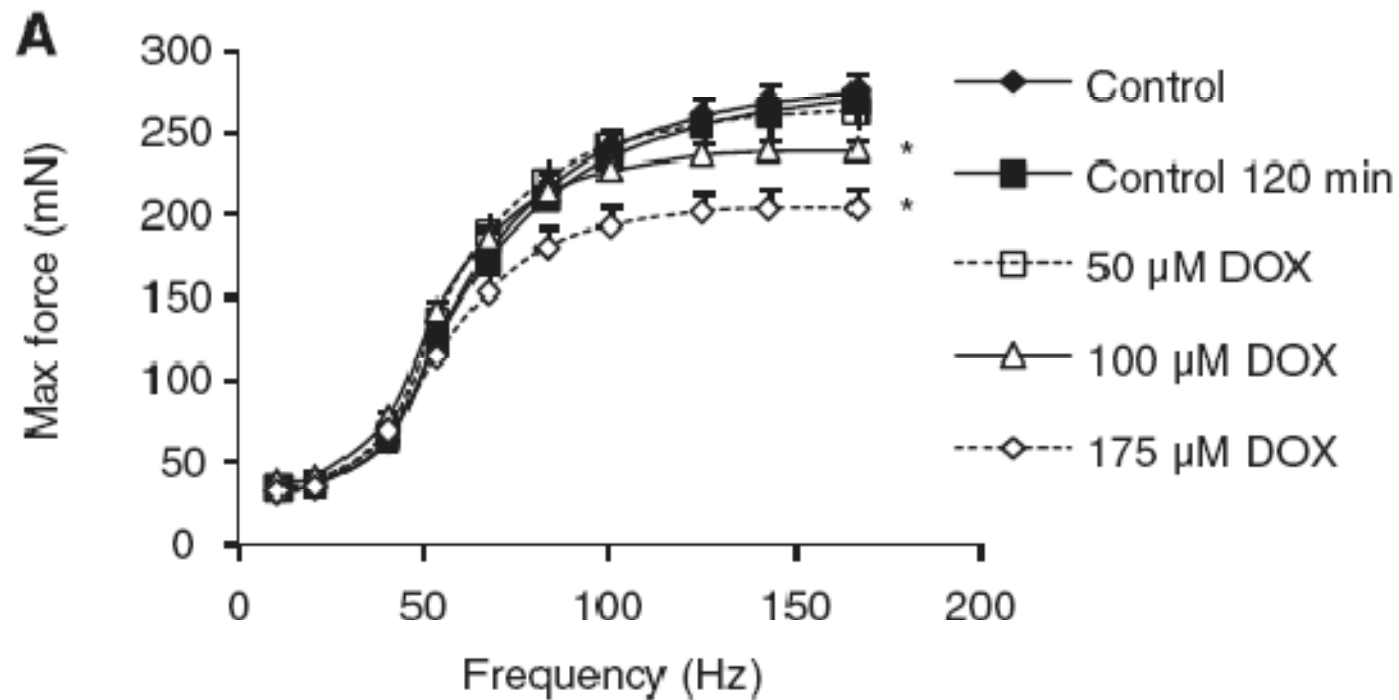


Short Communication

Direct effects of doxorubicin on skeletal muscle contribute to fatigue

K van Norren^{*,1,5}, A van Helvoort^{1,5}, JM Argilés², S van Tuijl¹, Karin Arts¹, M Gorselink¹, A Laviano³, D Kegler¹, HP Haagsman⁴ and EM van der Beek¹

¹Danone Research – Centre for Specialised Nutrition (formerly known as Numico Research), Wageningen, The Netherlands; ²Cancer Research Group, Facultat de Biologia, Departament de Bioquímica i Biologia Molecular, Universitat de Barcelona, Barcelona, Spain; ³Department of Clinical Medicine, University La Sapienza, Rome, Italy; ⁴Faculty of Veterinary Medicine, Utrecht University, Utrecht, The Netherlands

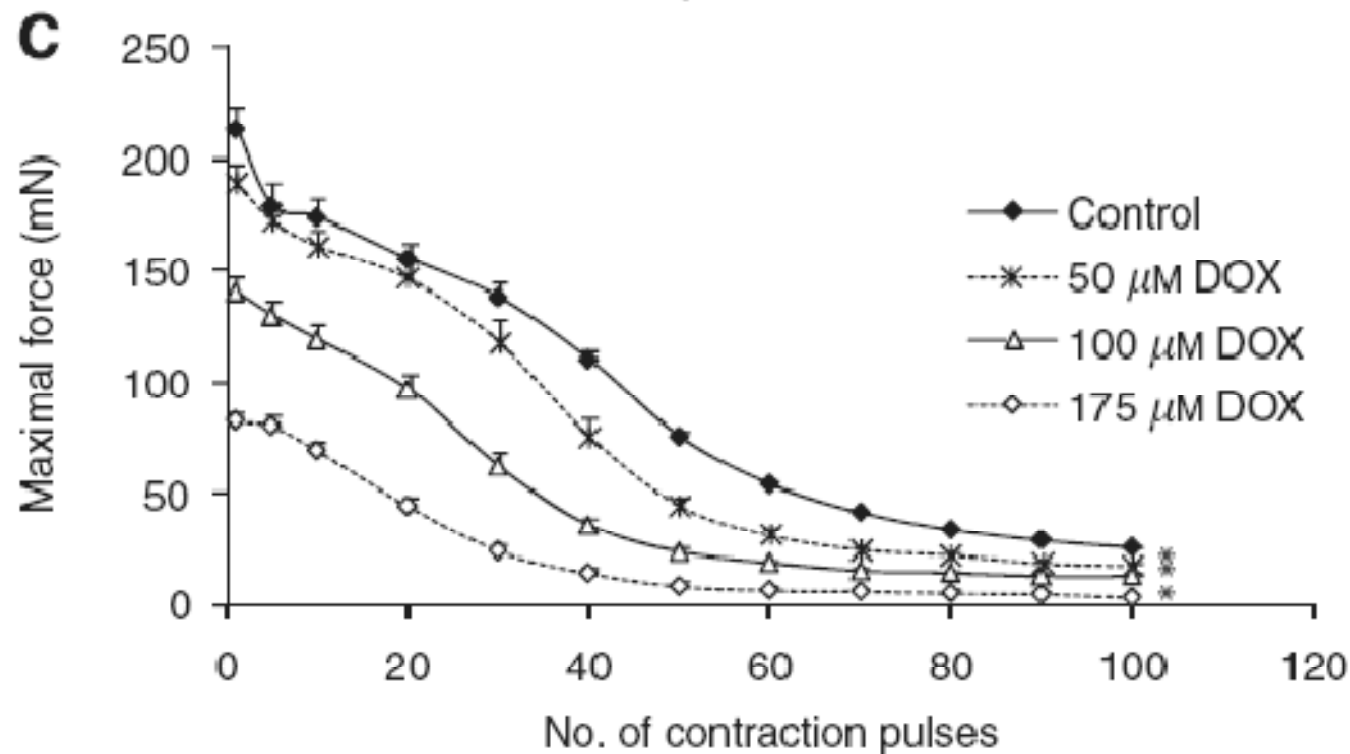


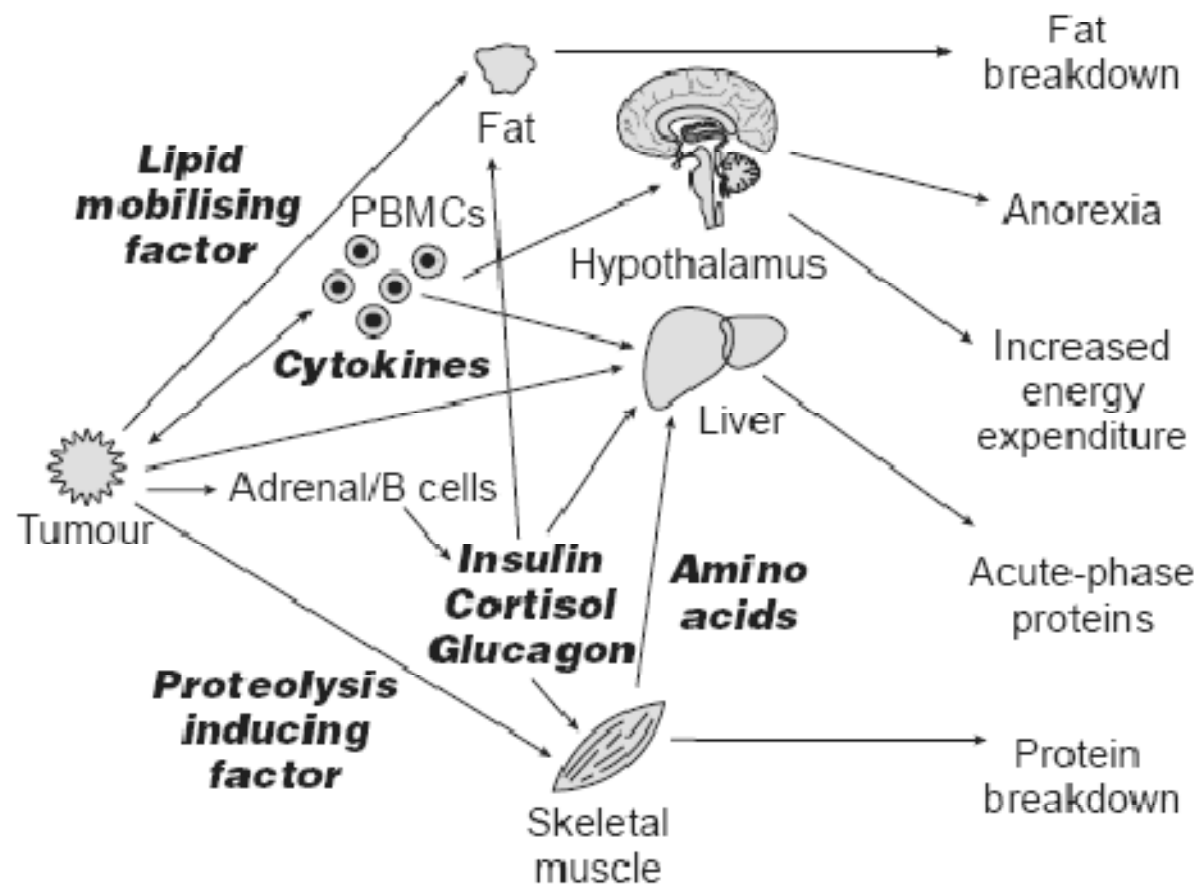
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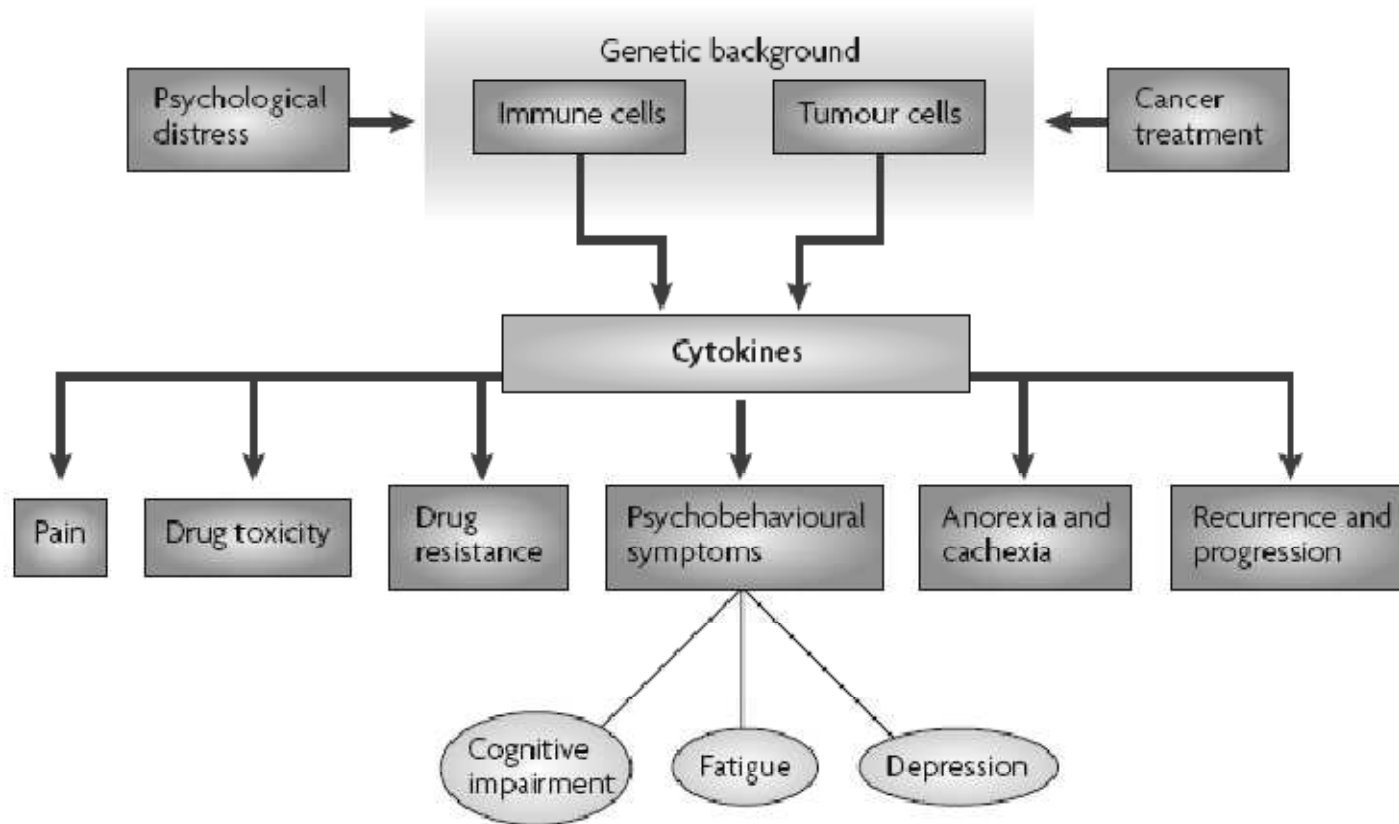
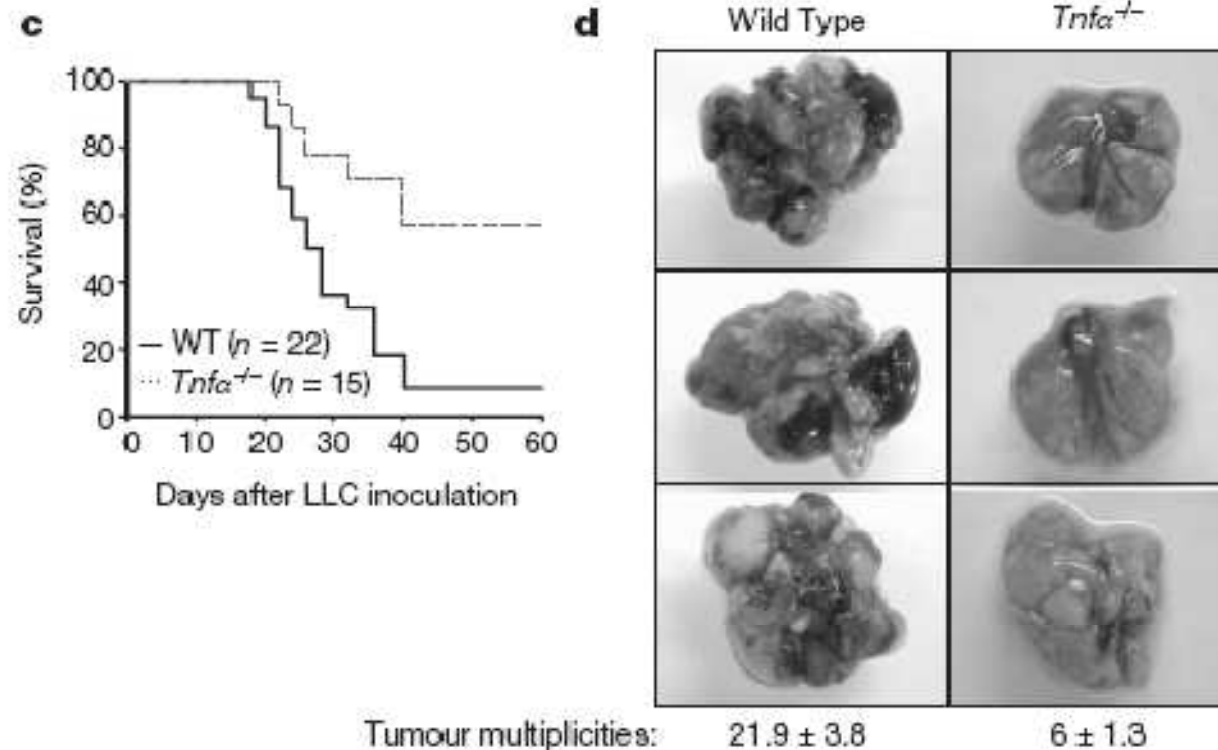
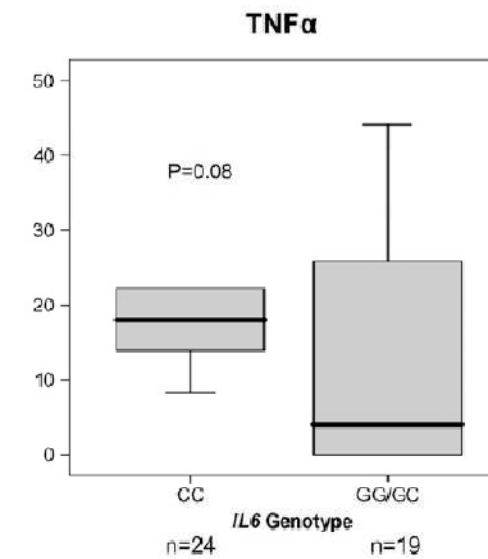
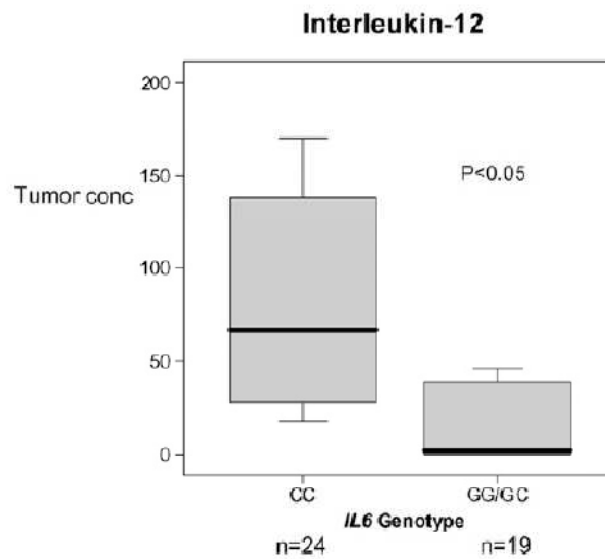
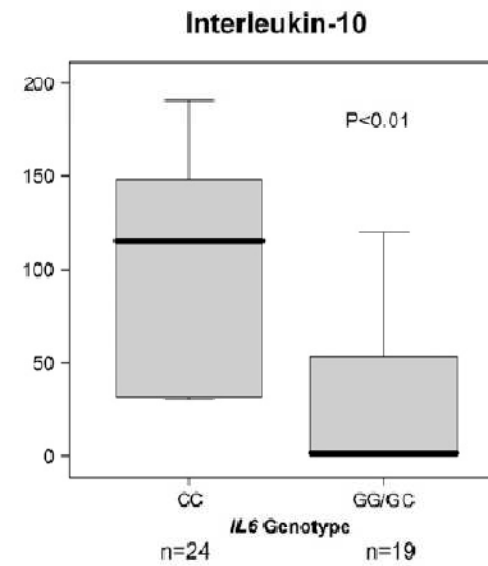
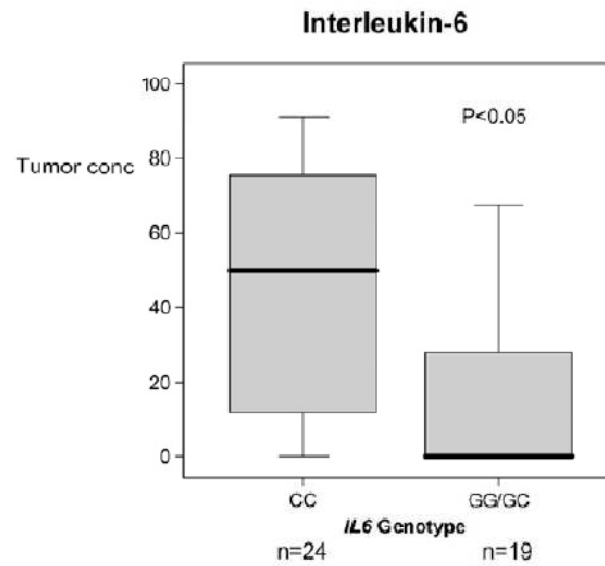


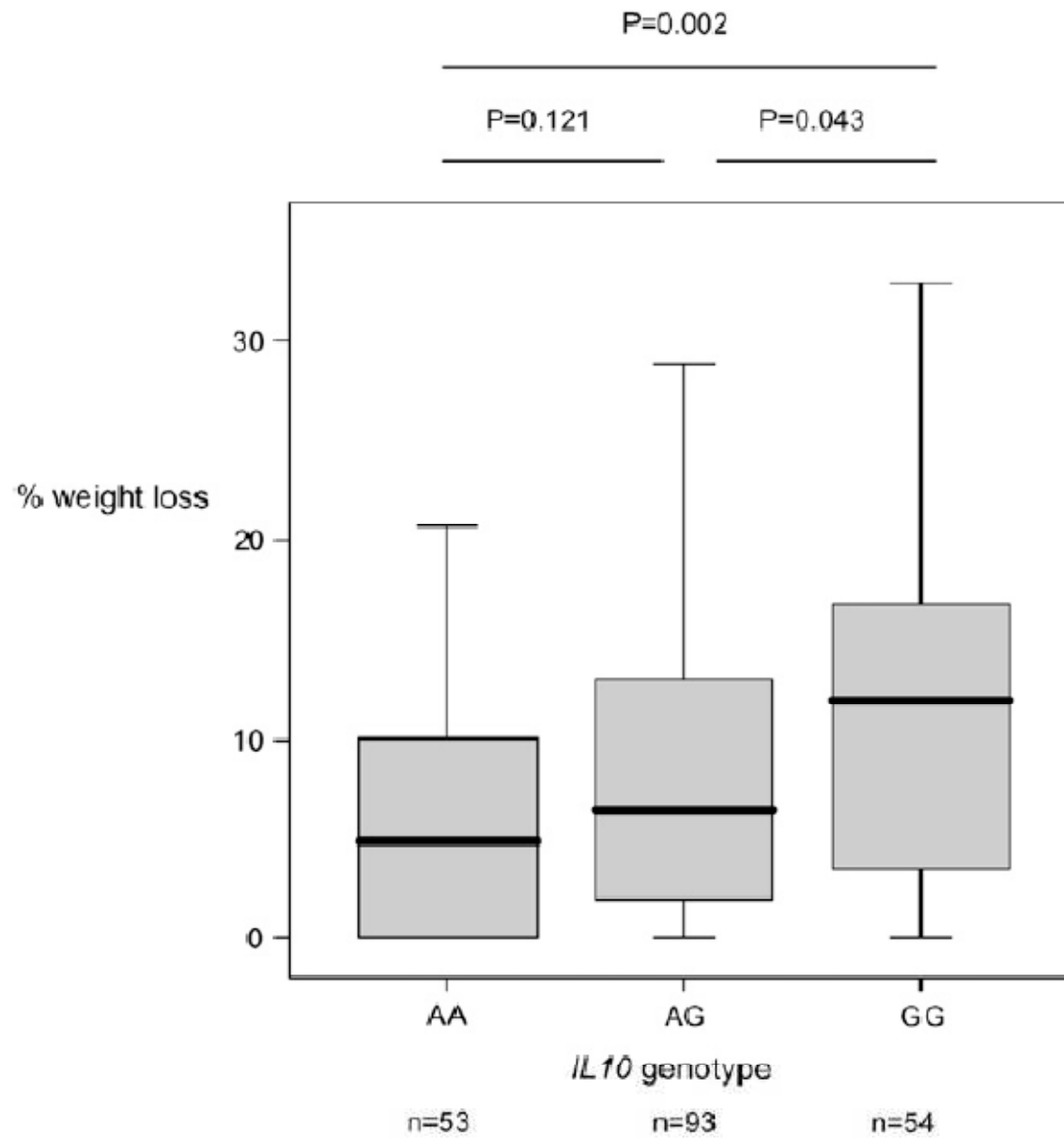
Figure 3 | **A conceptual model of cytokines in cancer.** Tumour and immune cells are sources of cytokines, which support the growth of cancer and lead to to psychobehavioural symptoms (fatigue, depression, and cognitive impairment), drug toxicity, drug resistance, anorexia and cachexia, pain, and cancer recurrence and progression. Genetic background, cancer treatment and psychological distress may corroborate the production of cytokines. In cancer survivors, hyperactive immune cells might be the major source of cytokines in psychobehavioural symptoms.

Carcinoma-produced factors activate myeloid cells through TLR2 to stimulate metastasis

Sunliwa Kim¹, Hiroyuki Takahashi¹, Wan-Wan Lin^{1,2}, Pascal Descargues¹, Sergei Grivennikov¹, Youngjun Kim^{1†}, Jun-Li Luo^{1†} & Michael Karin¹







Short Communication

The relationship between the preoperative systemic inflammatory response and cancer-specific survival in patients undergoing potentially curative resection for renal clear cell cancer

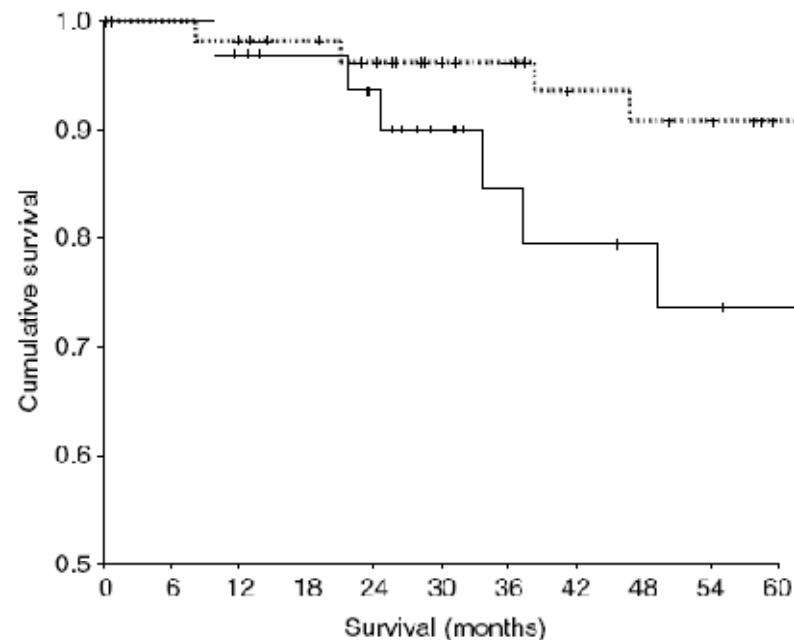


Figure 1 Relationship between preoperative C-reactive protein ($\leq 10/ >10 \text{ mg l}^{-1}$ from top to bottom) and cancer-specific survival in 'low' or 'intermediate risk' patients ($n=91$) undergoing potentially curative resection for renal cancer.

Full Paper

Evaluation of an inflammation-based prognostic score in patients with inoperable gastro-oesophageal cancer

ABC Crumley¹, DC McMillan¹, M McKernan¹, AC McDonald² and RC Stuart¹

¹University Department of Surgery, Royal Infirmary, Glasgow G3 7 2ER, UK; ²Beaumont Oncology Centre, Western Infirmary, Glasgow G11 6NT, UK

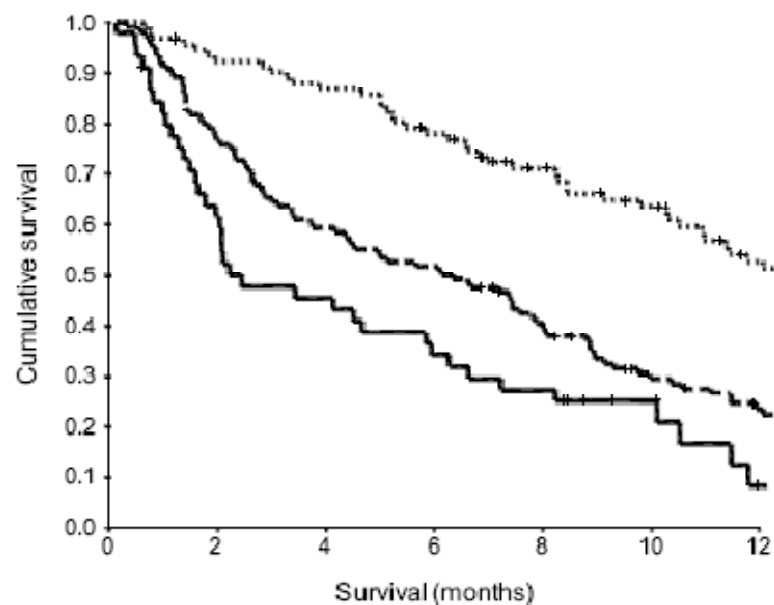


Figure 1 The relationship between an inflammation-based prognostic score (GPS, 0, 1, 2 from top to bottom) and survival in patients with inoperable gastro-oesophageal cancer.

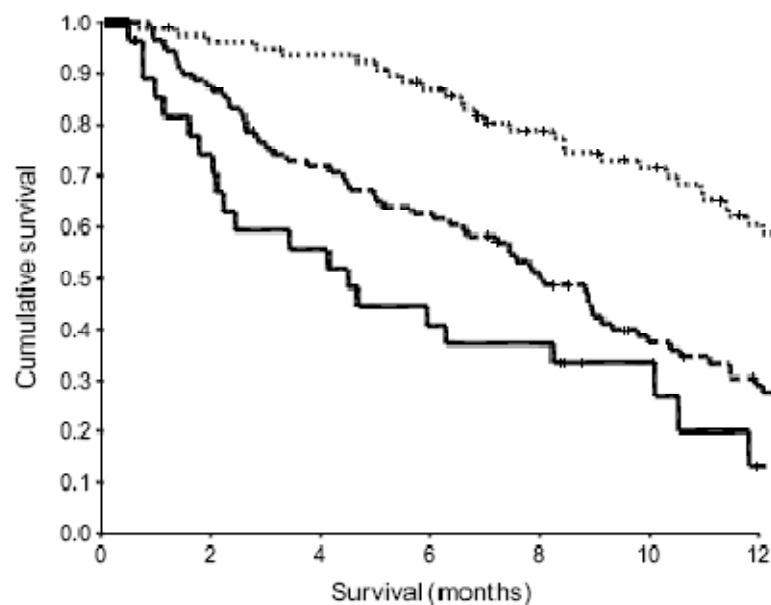


Figure 2 The relationship between an inflammation-based prognostic score (GPS, 0, 1, 2 from top to bottom) and survival in patients with inoperable gastro-oesophageal cancer receiving active treatment.

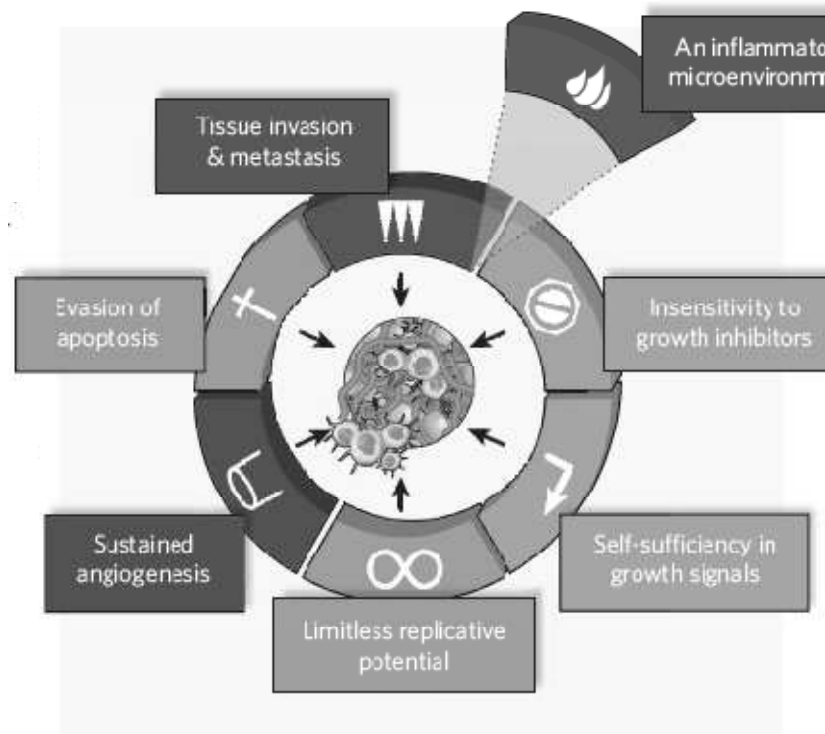


Figure 1 | The hallmarks of cancer. In 2000, Hanahan and Weinberg⁵ proposed a model to define the six properties that a tumour acquires. These are unlimited replicative potential, ability to develop blood vessels (angiogenesis), evasion of programmed cell death (apoptosis), self-sufficiency in growth signals, insensitivity to inhibitors of growth, and tissue invasion and metastasis. Kim and colleagues' findings², together with those of other studies^{3,4}, indicate that this model should be revised to include cancer-related inflammation as an additional hallmark. (Adapted from ref. 5.)



"Unfortunately, there's no cure—there's not even a race for a cure."

Palliative Nutritional Intervention in Addition to Cyclooxygenase and Erythropoietin Treatment for Patients with Malignant Disease: Effects on Survival, Metabolism, and Function

A Randomized Prospective Study

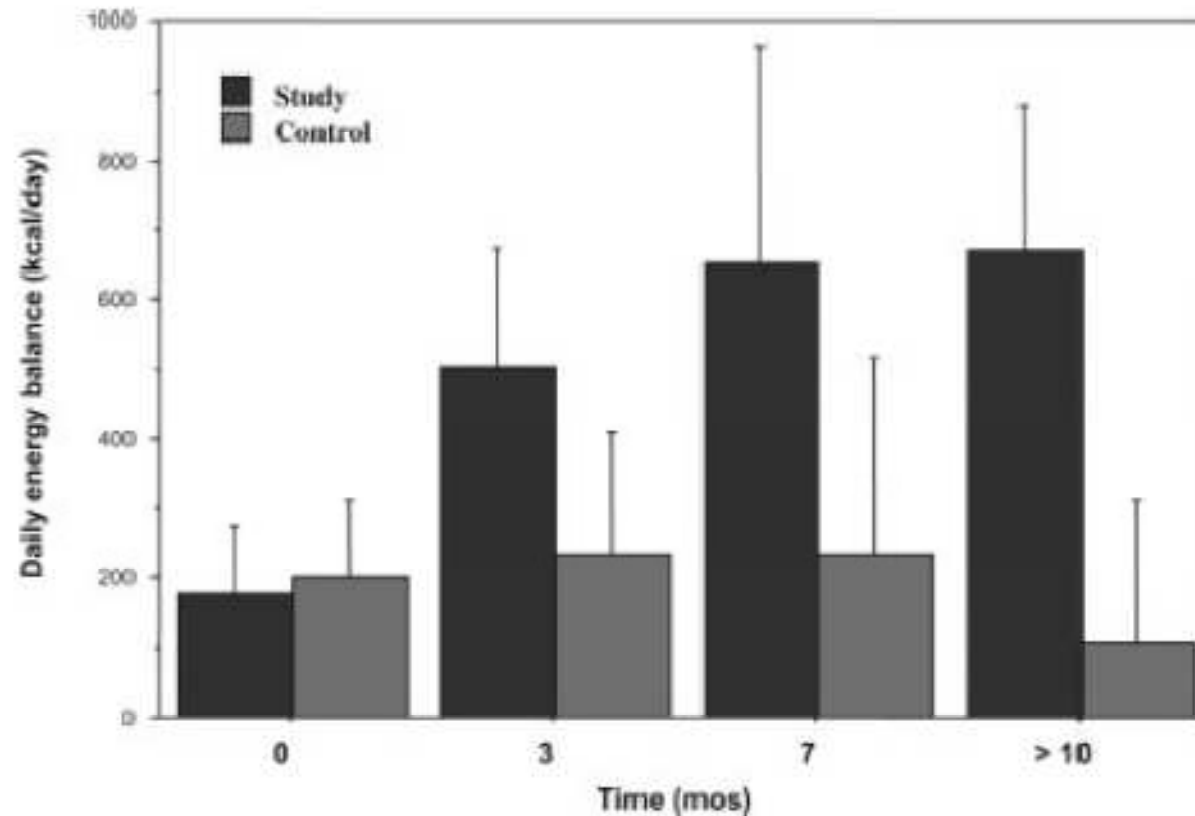


FIGURE 2. Energy balance in the study (nutritional support) and control groups ('as-treated' analysis of variance using survival as a covariate; $P < 0.001$).

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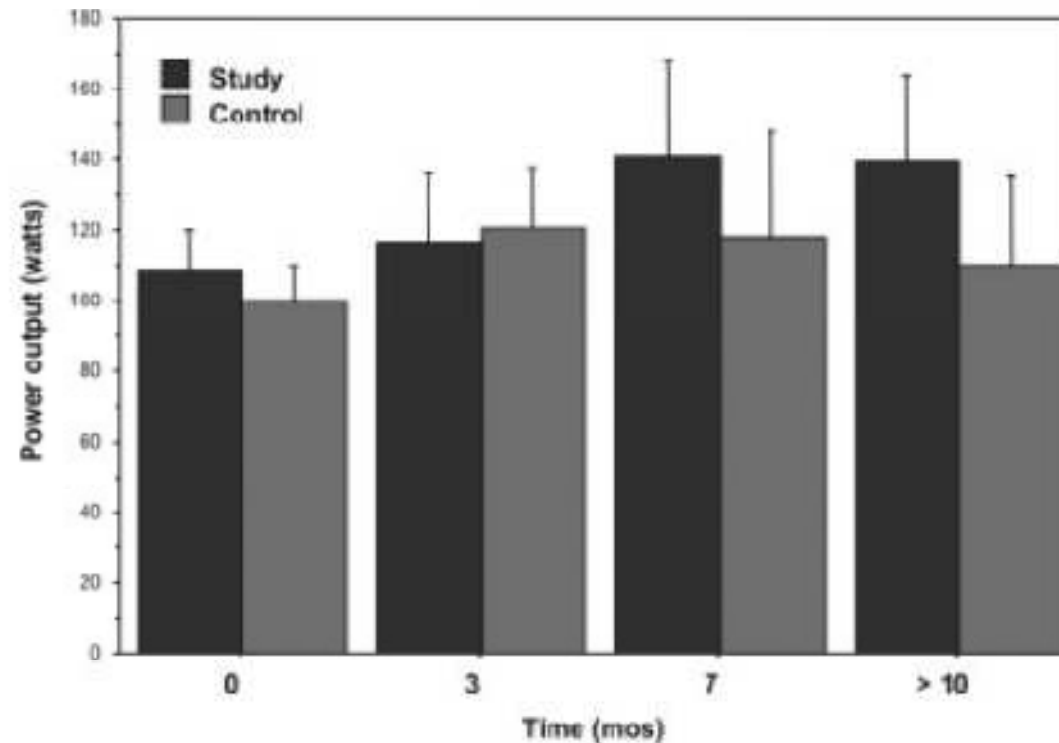
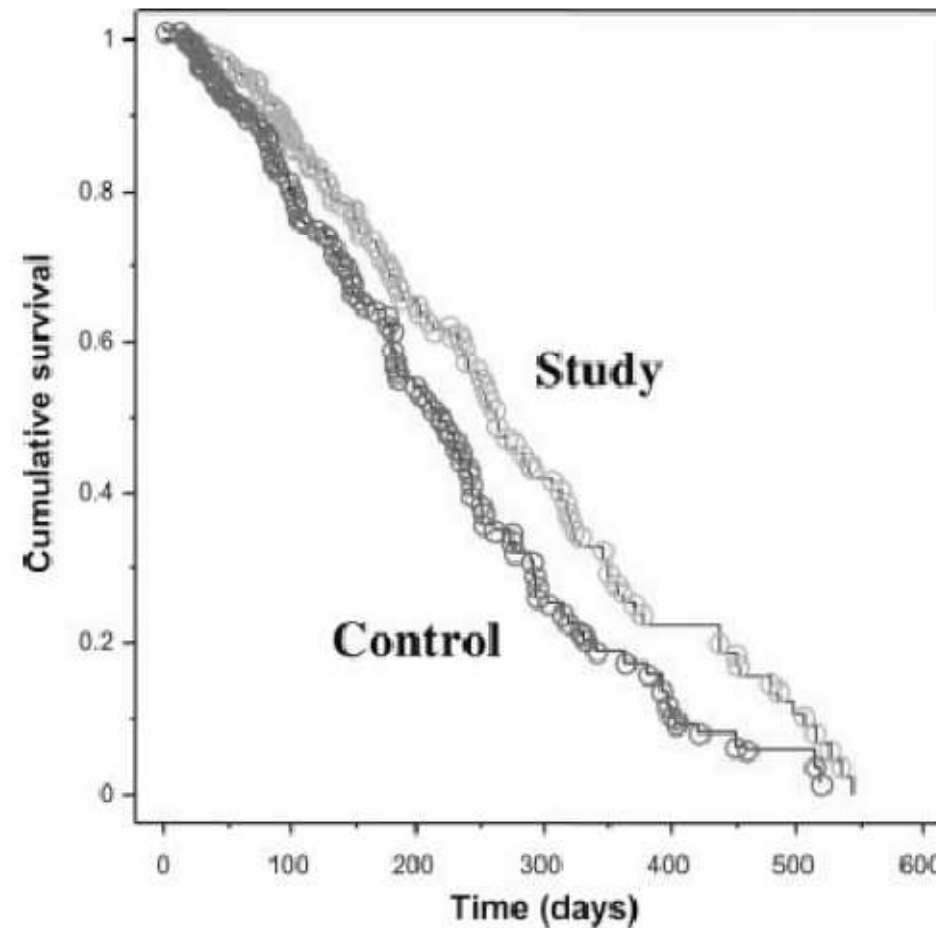


FIGURE 4. Maximum exercise capacity (power output) in the study (nutritional support) and control groups over the course of follow-up ('as-treated' analysis using survival as a covariate; $P < 0.04$).

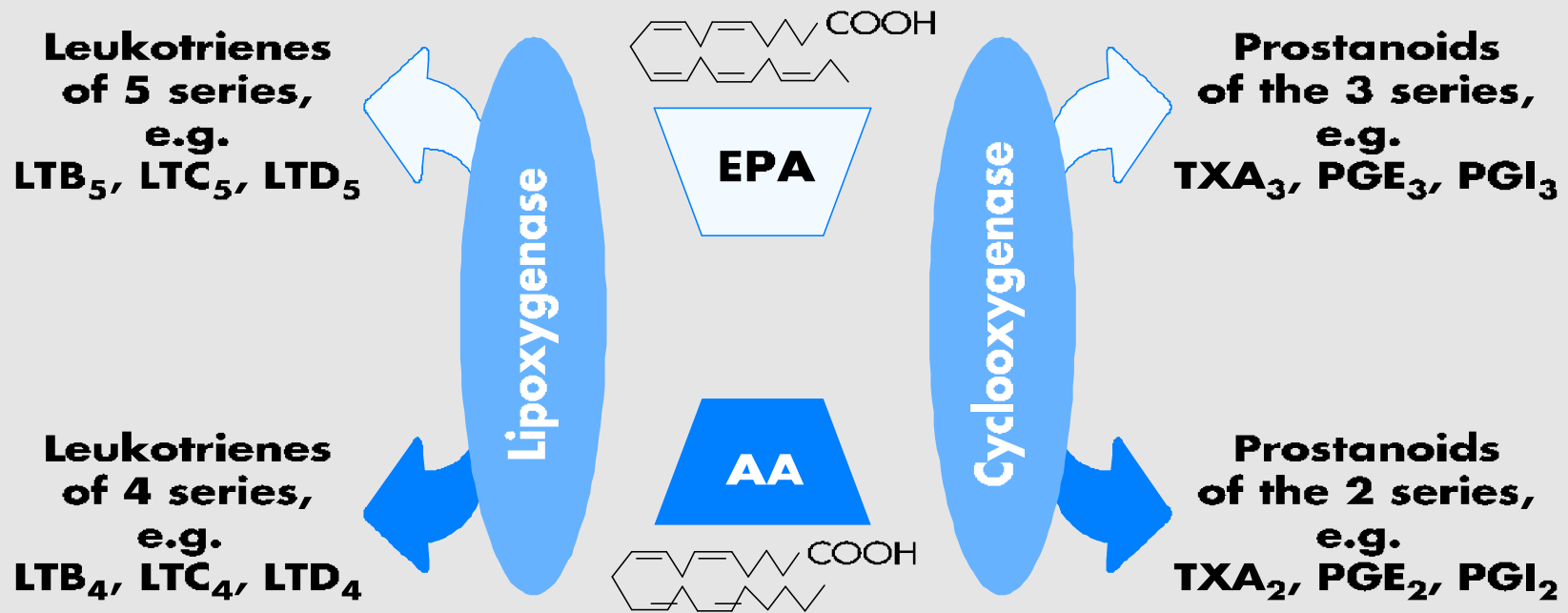
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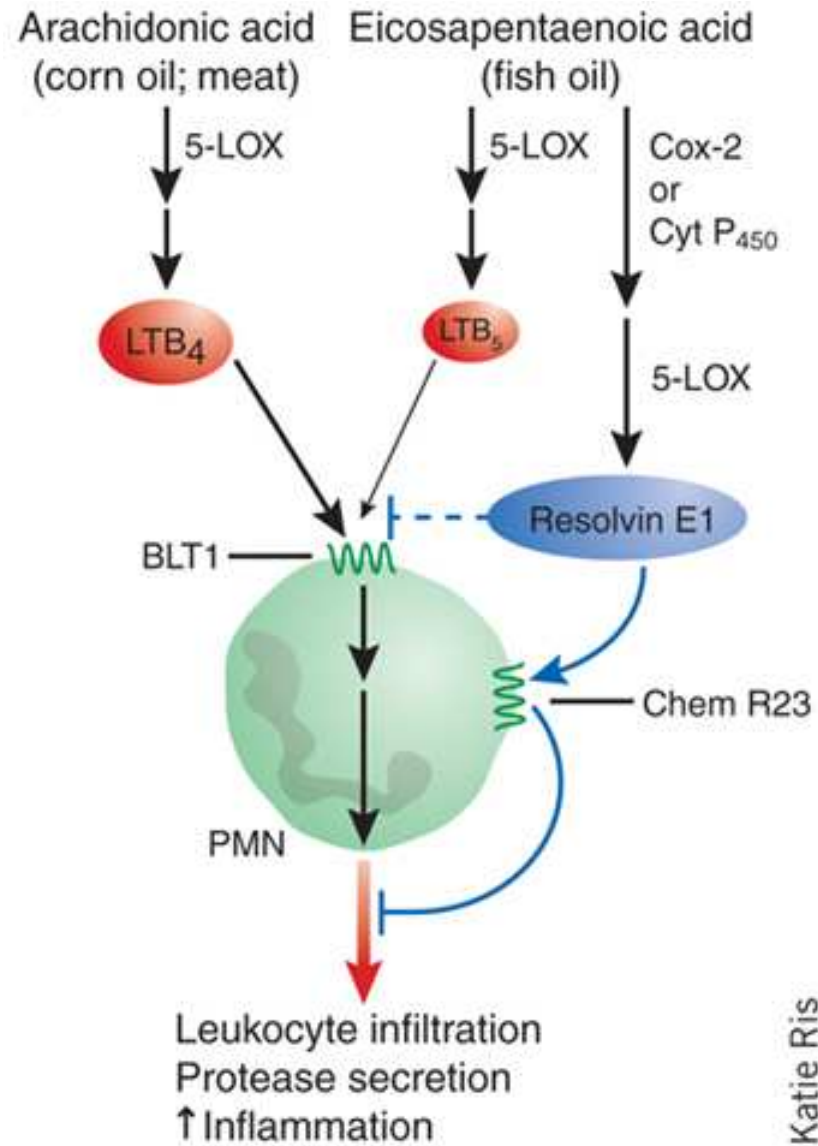


Lundholm K et al. Cancer 2004

Anti-inflammatory mediators



Pro-inflammatory mediators



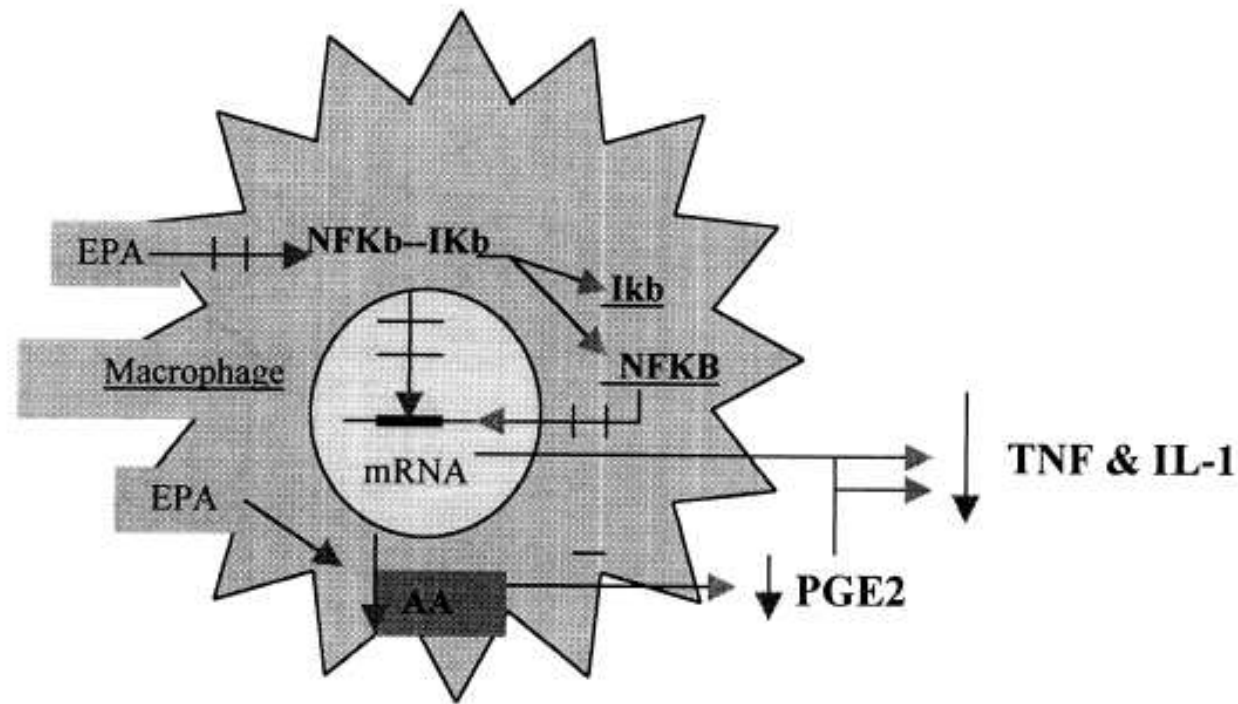
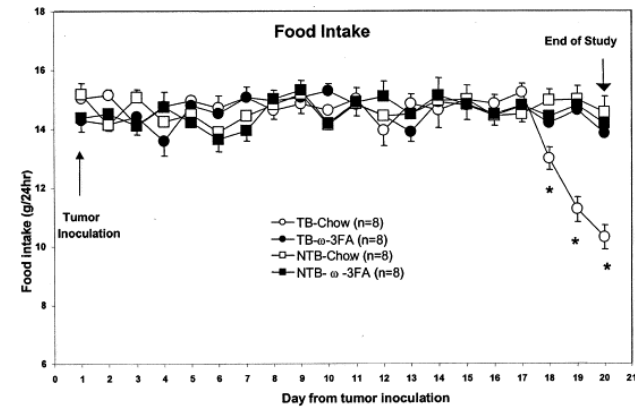
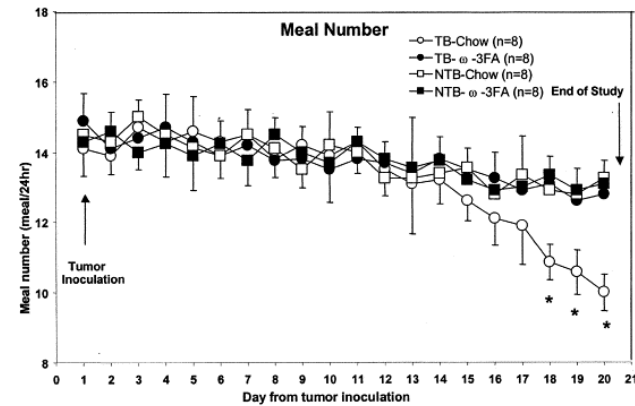


FIG. 2. EPA incorporates into the macrophage cell membrane (CM), replacing arachidonic acid (AA), thus reducing CM AA content. Decreased PGE2 production occurs as a function of decreased AA availability. EPA inhibits TNF gene transcription by preventing NFκb-Iκb dissociation, preventing NFκb translocation into the nucleus. As a consequence, overall TNF and IL-1 synthesis and release are reduced.

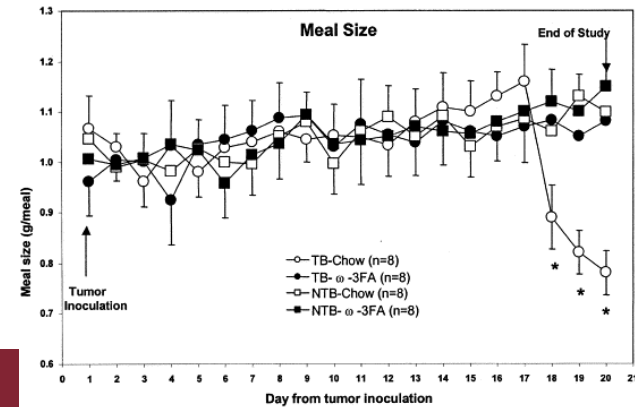
N-3 fatty acids in tumour-bearing rats



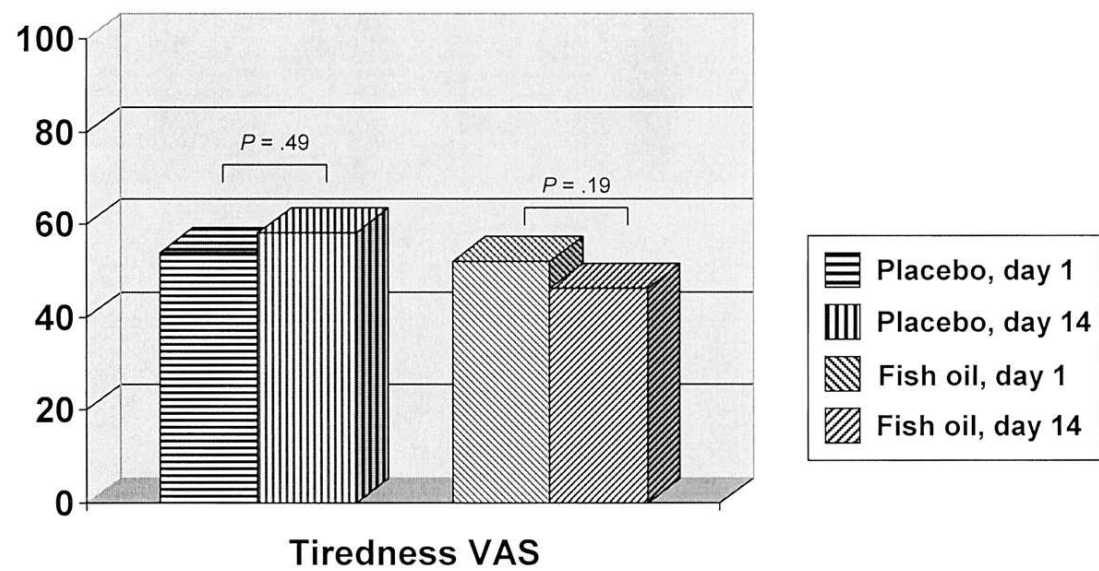
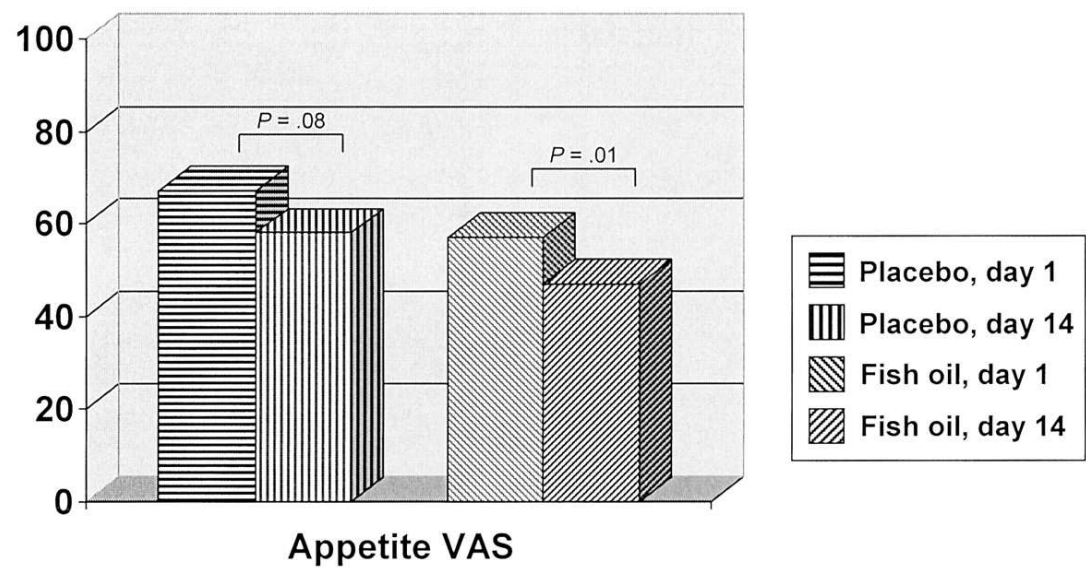
A

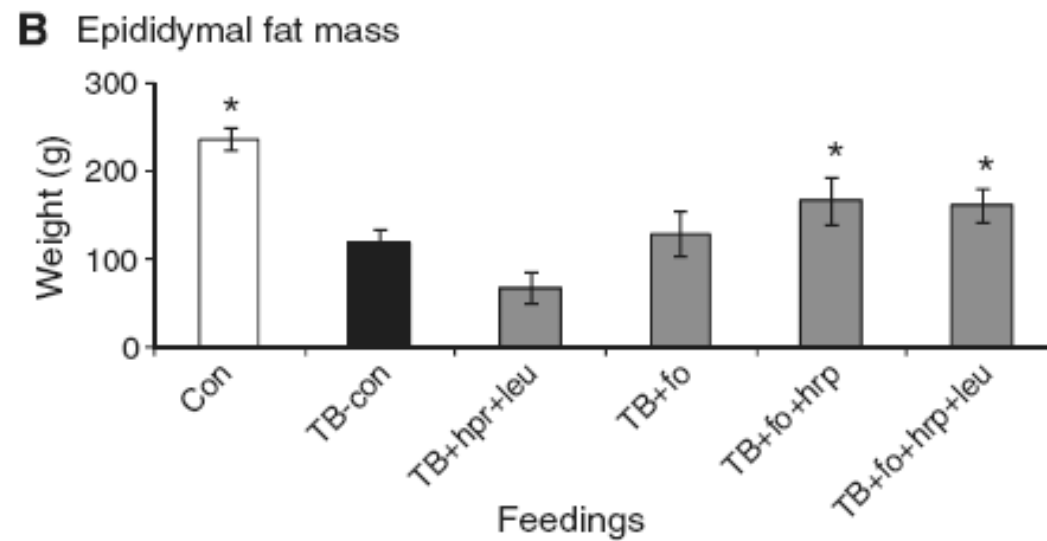
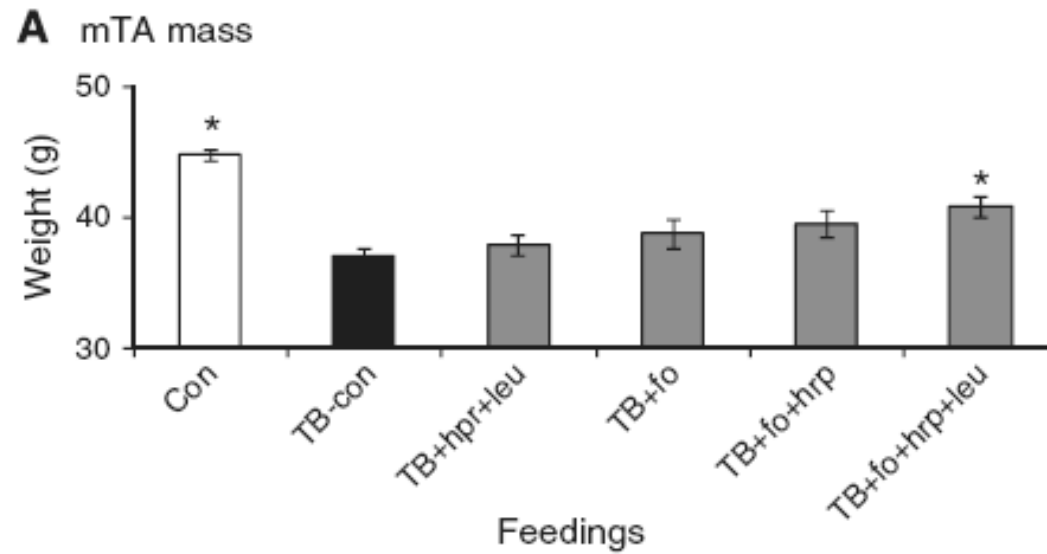


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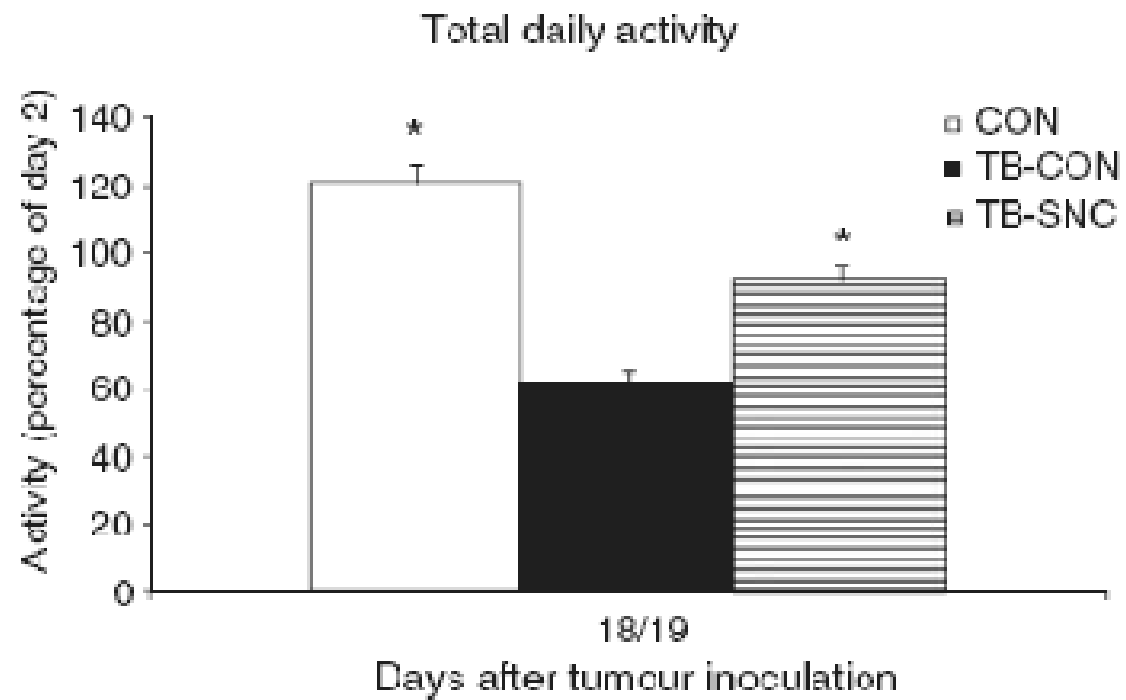


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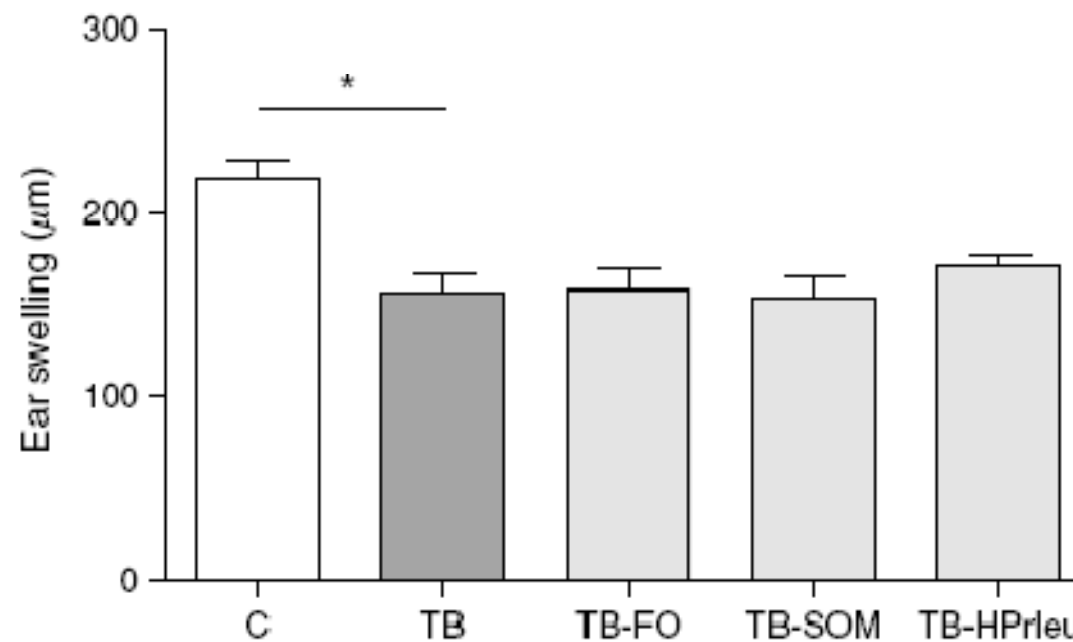


Figure 1 Effects of oral administration of fish oil, specific oligosaccharide mixture or high protein/leucine on contact hypersensitivity. Data represent means (μm) \pm s.e.m. of the control (C) group ($n = 20$), tumour-bearing control (TB) group ($n = 20$) and tumour-bearing groups after supplementation with fish oil (TB-FO, $n = 10$), specific oligosaccharide mixture (TB-SOM, $n = 10$) or high protein/leucine (TB-HPrleu, $n = 10$). *Significantly different ($P < 0.0125$) from the TB group.

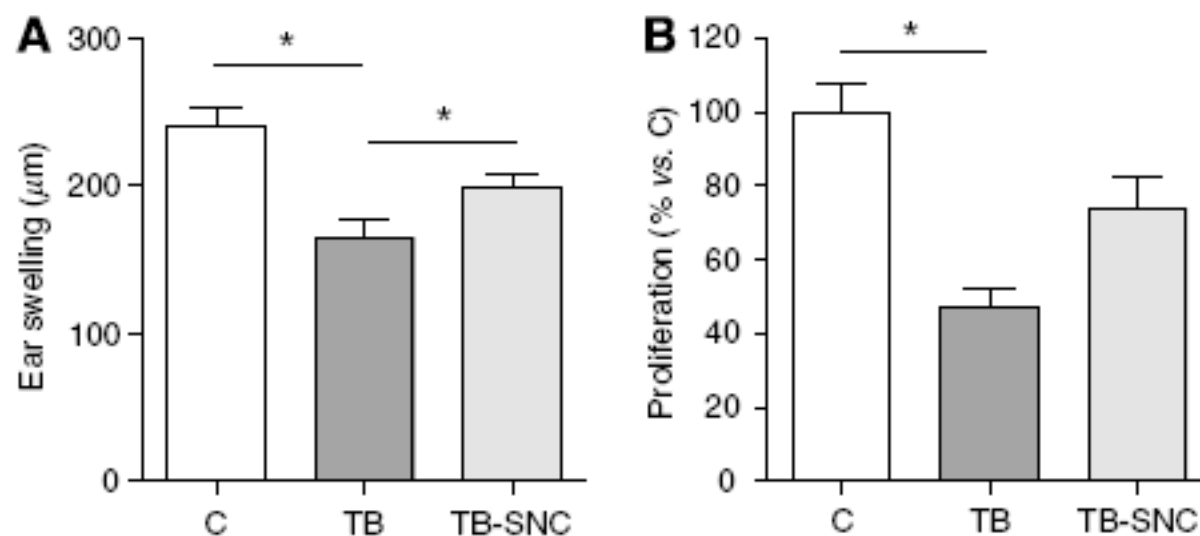


Figure 2 Effects of oral administration of the complete mixture of fish oil, specific oligosaccharide mixture and high protein/leucine on contact hypersensitivity (**A**) and ConA-stimulated T-lymphocyte proliferation by splenocytes (**B**). Data represent means \pm s.e.m. of the control (C) group ($n = 10$), tumour-bearing control (TB) group ($n = 19$) and tumour-bearing group after oral administration of the specific nutritional combination (TB-SNC) ($n = 20$). For ConA-stimulated T-lymphocyte proliferation, all values were calculated as the percentage of the control group, which is set at 100%. *Significantly different ($P < 0.025$) from the TB group.

Conclusions

- The best treatment for cancer-associated catabolism is effective anti-tumour therapy.
- Anti-neoplastic strategies may worsen nutritional status.
- Inflammation is a hallmark of cancer
- Anti-inflammatory therapeutic strategies should be always considered, possibly in combination with other anti-catabolic agents.

