Conclusions
Daily intake of omega-3 increases omega-3 index significantly without severe adverse events and is feasible with high compliance. The dose-escalation strategy provides robust evidence to calculate appropriate dosages for future trials with the goal of promoting improved relapse-free survival with less long-term side effects.

Background
The long chain polyunsaturated omega-3 fatty acids docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) have anticancer properties that have been implicated in cancer prevention. Tumor growth has been inhibited in vitro and in vivo and the effect of cytostatic drugs enhanced. DHA is abundant in the brain and has been implicated in neuroprotection. In addition, omega-3 supplementation has positive effects on children with neurodevelopmental disorders.

Altogether, these preclinical results suggest that omega-3 exhibits beneficial properties both as an adjuvant in the treatment of childhood cancer and as a dietary supplement for prevention of relapses and reducing long term side effects in childhood cancer survivors.

Results
Enrolled participants (Fig 2) received increasing doses of daily Omega-3 supplementation (Fig 3) during 90 days. Omega-3 index increased significantly in a dose-dependent fashion (Fig 4) and the omega-6/omega-3 ratio decreased significantly (Fig 5). Most children showed an excellent compliance without any relation to the omega-3 dose (Fig 6) and without any unexpected or serious side effects.

Participants

Figure 1. We included forty children aged 2-18 (median 9.3) in remission after completed cancer treatment. Food frequency questionnaire was performed at start. Blood and urine sampling, body measurements and behavior questionnaires were performed before, during and after the study.

Figure 2. Descriptive information of the forty study participants.

Figure 3. Prescribed dose Omega-3(DHA, EPA 1:1) mg/BSA.

Figure 4. Omega-3 index defined as percentage eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) in erythrocytes, as measured by gas chromatography tandem mass spectrometry (GC-MS/MS).

Figure 5. Omega-6/omega-3 index defined as arachidonic acid (AA)/docosahexaenoic acid (DHA) in erythrocytes, as measured by GC-MS/MS.

Figure 6. Compliance (%) evaluated through patient diary and number of returned unused packages at the end of the study.

No severe adverse events were registered.

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Studies outline

Visit 1
Day 0
Visit 2
Day 45±7
Visit 3
Day 90±7

Blood & Urine sampling
Anthropometry measurements
Food Frequency Questionnaire
5-15 Questionnaire
AE Evaluation
Compliance Evaluation

Figure 1. Previous diagnosis

91.1% leukemia/lymphoma
13.3% brain tumors
22.1% other

Figure 2. Age distribution

40.6% 0-4 years
38.9% 5-12 years
19.4% 13-18 years