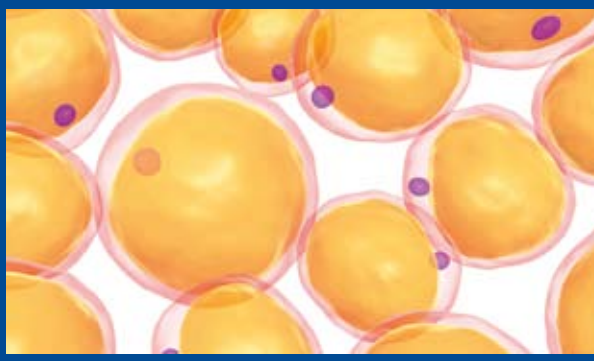
NCT-Conference

Exercise, Energy Balance and Cancer

Defining the Role and Potential of Exercise and Body Weight Maintenance in Cancer Prevention, Treatment and Outcomes



Communication Center,
DKFZ Heidelberg
15th and 16th November 2010

Conference Program

Conference Committee:
Prof. Dr. Cornelia Ulrich
PD Dr. Karen Steindorf
Dr. Joachim Wiskemann
Prof. Dr. Dirk Jäger

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NCT

NATIONALES CENTRUM
FÜR TUMORERKRANKUNGEN
HEIDELBERG

getragen von:
Deutsches Krebsforschungszentrum
Universitätsklinikum Heidelberg
Thoraxklinik-Heidelberg
Deutsche Krebshilfe

CONTENTS

WELCOME TO THE „EXERCISE, ENERGY BALANCE AND CANCER“ CONFERENCE HEIDELBERG 15th & 16th NOVEMBER 2010

Dear Colleagues and Friends,

On behalf of the Organizing Committee I would like to welcome you warmly to our first international conference on “Exercise, Energy Balance and Cancer”. This interdisciplinary event will focus on a very important and timely area of cancer prevention and cancer prognosis. We are delighted that so many experts from near and far are convening here to discuss topics ranging from the role of obesity and energy metabolism in carcinogenic processes and cancer risk to the how’s and why’s of exercise training during cancer treatment.

There will be many opportunities to learn and engage in discussion and hopefully to shape future research and public health or clinical programs in Germany.
We are looking forward to your active participation and wish you an inspiring and enjoyable time in Heidelberg.

Yours truly,

Cornelia Ulrich

Cornelia Ulrich
(Conference Chair)

Conference Committee

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„Exercise, Energy Balance and Cancer“

- Conference Heidelberg 15th & 16th November 2010 -

Scientific Program

Monday Nov. 15th, 2010

I) 1.00 p.m.

Welcome: Prof. Cornelia Ulrich (Conference Chair, National Center for Tumor Diseases)
& Prof. Otmar Wiestler (Director, German Cancer Research Center, Heidelberg)

II) 1.20 – 1.40 p.m.

Keynote Lecture:

“Building a Research Agenda for Exercise, Energy Balance and Cancer”
Prof. Nathan Berger – Case Western Reserve University, Cleveland

III) 1.40 – 3.20 p.m.

Session I: “Physical Activity and Energy Balance – From Cancer Prevention to Cancer Survivorship”

Chairs: *Prof. Michael Leitzmann* (University of Regensburg) & *Prof. Jenny Chang-Claude* (German Cancer Research Center, Heidelberg)

Topics:

1.40 – 2.05 p.m. **Physical Activity, Fitness and Fatness: Where are we Today and Where to Go for Primary Cancer Prevention?**
(PD Dr. Karen Steindorf – German Cancer Research Center, Heidelberg)

2.05 – 2.30 p.m. **Breast Cancer Prevention and Survivorship**
(Prof. Melinda Irwin – Yale School of Medicine, Yale)

2.30 – 2.55 p.m. **Physical Activity and Colorectal Cancer Survivorship**
(Prof. Jeffrey Meyerhardt – Dana-Farber Cancer Institute and Harvard Medical School, Boston)

2.55 – 3.20 p.m. **Challenges in the Field of Physical Activity Assessment**
(Prof. Inger Thune - Ulleval University Hospital, Oslo)

3.20 – 3.50 p.m. Coffee – Break

VI) 3.50-5.30 p.m.

Session II: "Mechanisms Linking Physical Activity and Energy Balance to Cancer Risk and Survival"

Chairs: *Prof. Cornelia Ulrich* (National Center for Tumor Diseases) & *Prof. Melinda Irwin* (Yale School of Medicine)

Topics:

3.50 – 4.15 p.m. **DNA Repair & Inflammation Mechanisms**
(Prof. Cornelia Ulrich – National Center for Tumor Diseases, Heidelberg)

4.15 – 4.40 p.m. **Adipose Tissue Biology**
(Prof. Mario Kratz – Fred Hutchinson Cancer Research Center, Seattle)

4.40 – 5.05 p.m. **When Hormones Go Awry:Metabolic Factors in Energy Balance**
(Prof. Rudolf Kaaks - German Cancer Research Center, Heidelberg)

5.05 – 5.30 p.m. **Exercise and Immune Function: What is the Evidence?**
(Prof. Connie Rogers – Pennsylvania State University)

5.30 -5.45 p.m. ***Break***

V) 5.45-7.15 p.m.

Session III: "Effects of Exercise During Anti-Cancer Therapy"

Chairs: *PD Dr. Fernando Dimeo* (Charité, Berlin) & *Prof. Dirk Jäger* (National Center for Tumor Diseases, Heidelberg)

Topics:

5.45 – 6.15 p.m. **Introduction to the Field of Interventional Research – Examples from Hematology**
(Prof. Fernando Dimeo – Charité, Berlin)

6.15 – 6.40 p.m. **Exercise during chemotherapy -Body and Cancer -a randomized trial**
(Dr. Morten Quist - Universitetshospitalernes Center, Copenhagen)

Proffered Abstracts:

6.40 – 6.55 p.m. **Somato-Psychological Care Program to Improve Symptoms in Cancer Patients with Stem Cell Transplantation (HSCT) – Preliminary Results of a Prospective Intervention Study**
(Patrik Jahn et al. – Martin-Luther-University Halle-Wittenberg)

6.55 – 7.10 p.m. **Promotion of Physical Activity in Pediatric Patients with a Bone Tumor: First Results**
(Dr. Corinna Winter et al. – University Hospital Münster)

7.15 p.m. – open end Get Together:
Buffett Dinner with Poster Session - afterwards Party/Dance

Tuesday Nov. 16th, 2010

VI) 8.30-10.15 a.m.

Session IV: "Exercise Interventions in Different Clinical Settings"

Chairs: *Prof. Peter Bärtsch* (University Clinic of Heidelberg) & *Prof. Michael Thomas* (Thorax Clinic Heidelberg)

Topics:

8.30 – 9.00 a.m. **Exercising with Pediatric Cancer Patients**
(Prof. Alejandro Lucia - Universidad Europea de Madrid, Madrid)

9.00 – 9.25 a.m. **Exercise in Palliative Settings**
(Prof. Elke Jäger –
Northwest Hospital, Frankfurt)

9.25 – 9.50 a.m. **Resistance Training in Cachexia Patients**
(Dr. Holger Krakowski-Roosen –
German Cancer Research Center, Heidelberg)

Proffered Abstracts:

9.50 – 10.05 a.m. **Fatigue Mediates the Relationship Between Physical Fitness and Quality of Life in Cancer Survivors**
(Dr. Laurien Buffart et al. – EMGO Institute for Health and Care Research, Amsterdam)

10.05 – 10.30 a.m. Break

VII) 10.30 - 12.00 a.m.

Session V: "Beyond the Clinic: Sustainability of Exercise"

Chairs: *Prof. Winfried Banzer* (University of Frankfurt) & Prof. *Elke Jäger* (Northwest Hospital, Frankfurt)

Topics:

10.30 – 10.55 a.m. **Challenges and Potentials of Rehabilitation in Cancer Patients**
(Prof. Helge Bartsch - Tumor Biology Center, Freiburg)

10.55 – 11.20 a.m. **Outdoor Events in Cancer Patients**
(Dr. Freerk Baumann - German Sport University, Cologne)

11.20 – 11.45 a.m. **Self-Efficacy as an Important Predictor for Sustainability**
(Prof. Gerhard Huber - University of Heidelberg)

Proffered Abstracts:

11.45 – 12.00 a.m. **Point-of-Choice Interventions:**
A Public Health Approach Targeting Energy Balance
(Dr. Müller-Riemenschneider et al. – Charité, Berlin)

12.00 a.m. – 1.30 p.m. Poster Session and Lunch

VIII) 1.30- 3.00 p.m.

Session VI: "Future Directions and Funding Opportunities in Exercise, Energy Balance and Cancer Research"

Discussion Leaders: *Prof. Cornelia Ulrich* (National Center for Tumor Diseases, Heidelberg)
& *PD Dr. Karen Steindorf* (German Cancer Research Center, Heidelberg)

Panelists:

i. **Exercise and Energy Balance – Perspective of the National Cancer Institute**
(Dr. Linda Nebeling – National Cancer Institute, Bethesda)

ii. **Discussion with Representatives from Funding Agencies and Researchers**
Dr. Linda Nebeling (National Cancer Institute)
Dr. Robert Croyle (National Cancer Institute)
Dr. Manfred Lautenschläger (Manfred Lautenschläger Stiftung)
Prof. Elke Jäger (Northwest Hospital, Frankfurt)

3.00 p.m. Coffee & END

The EEBC Conference at Heidelberg – and how to find us?

Local Travel Information:

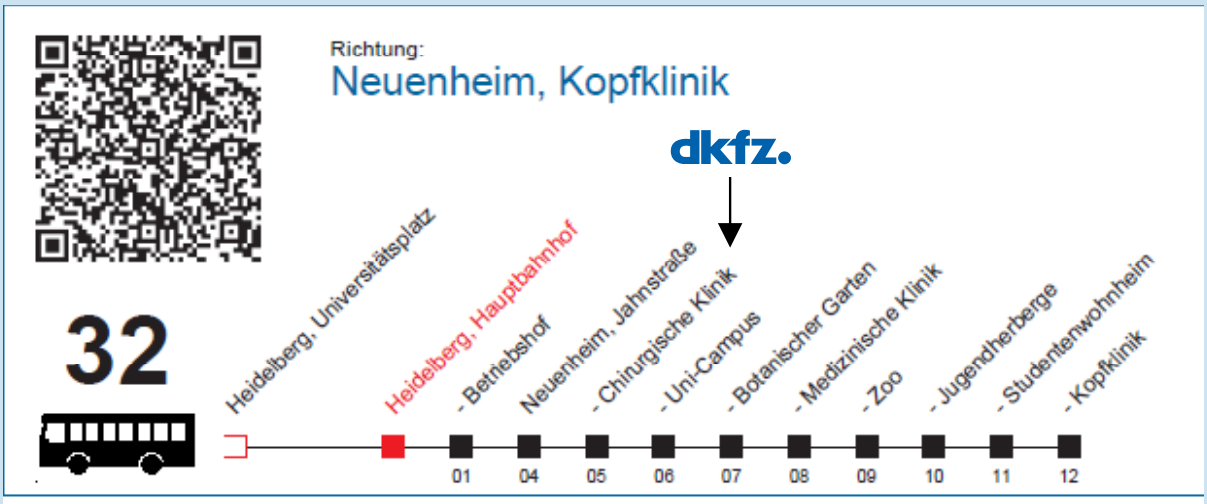
The EEBC Conference takes place at the Communication Center (Kommunikationszentrum) of the German Cancer Research Center (DKFZ).
The Communication Center is located in the DKFZ Main Building – Im Neuenheimer Feld 280.

The closest bus stop to the DKFZ is called "Chirurgische Klinik".

The closest tram stop to the DKFZ is called "Jahnstraße".

Bus schedules:

Central Station → DKFZ



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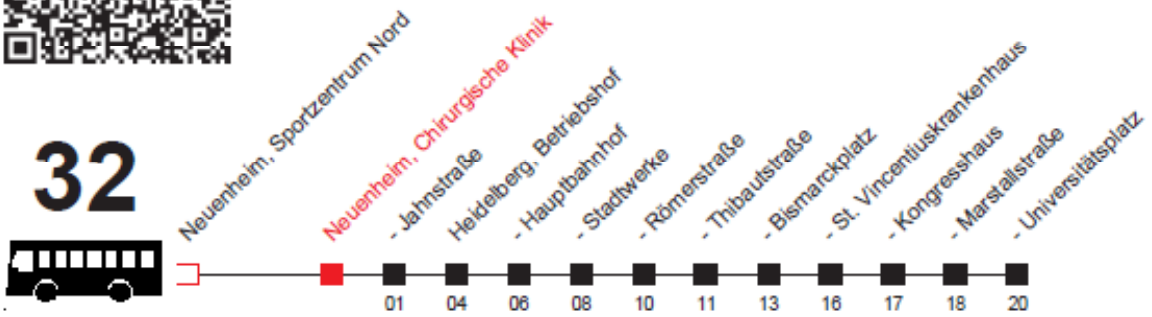
Am 24. und 31.12. Verkehr wie an Samstagen
A: bis Heidelberg, Betriebshof

DKFZ → Central station (→ Bismarckplatz → University Square)

Richtung:

Universitätsplatz

32



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Uhr	Samstag		
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Uhr	Sonn- und Feiertag		
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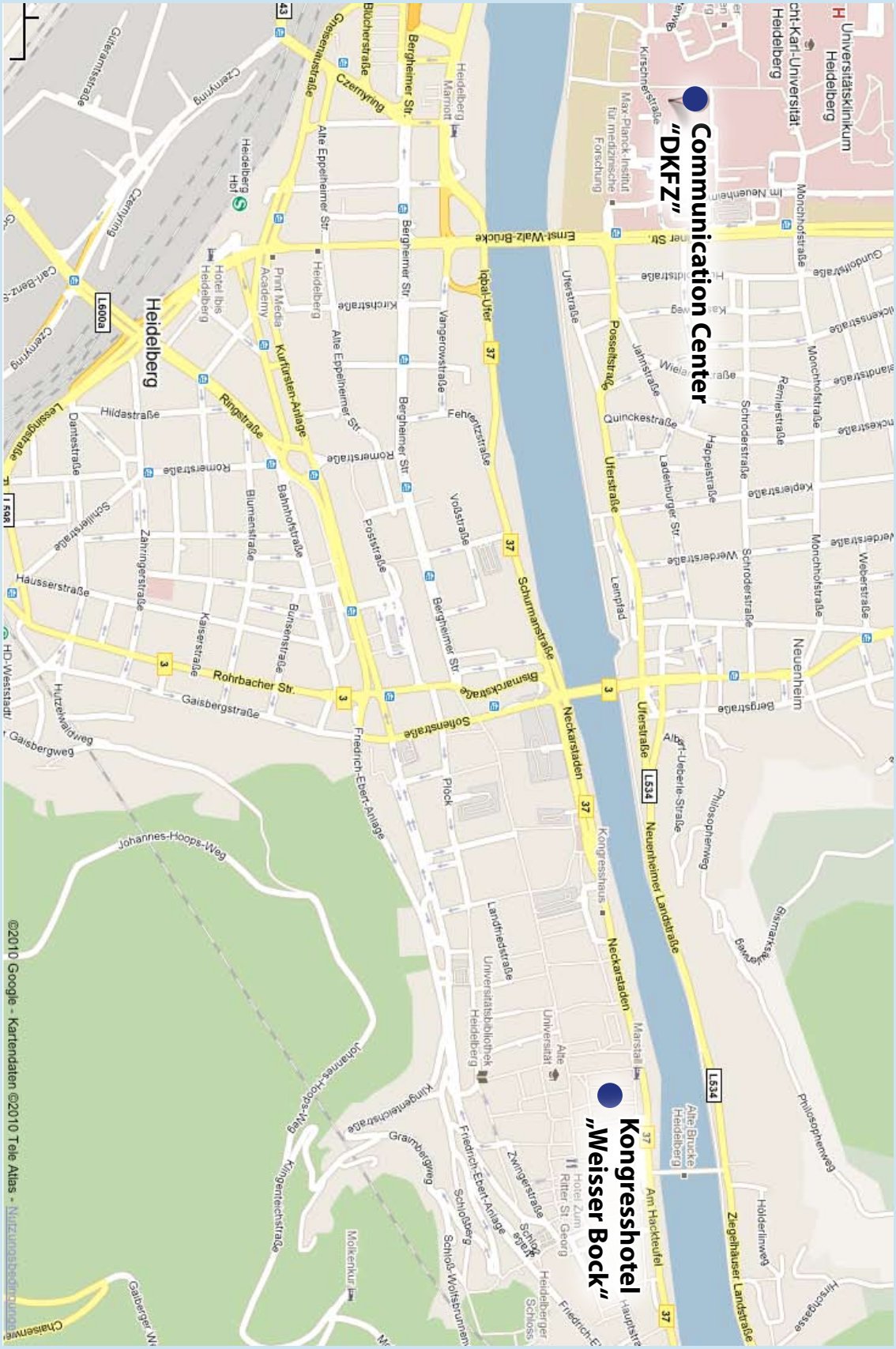
22	26[B]	56[B]	
23	26[B]	56[B]	
0	26[A]		

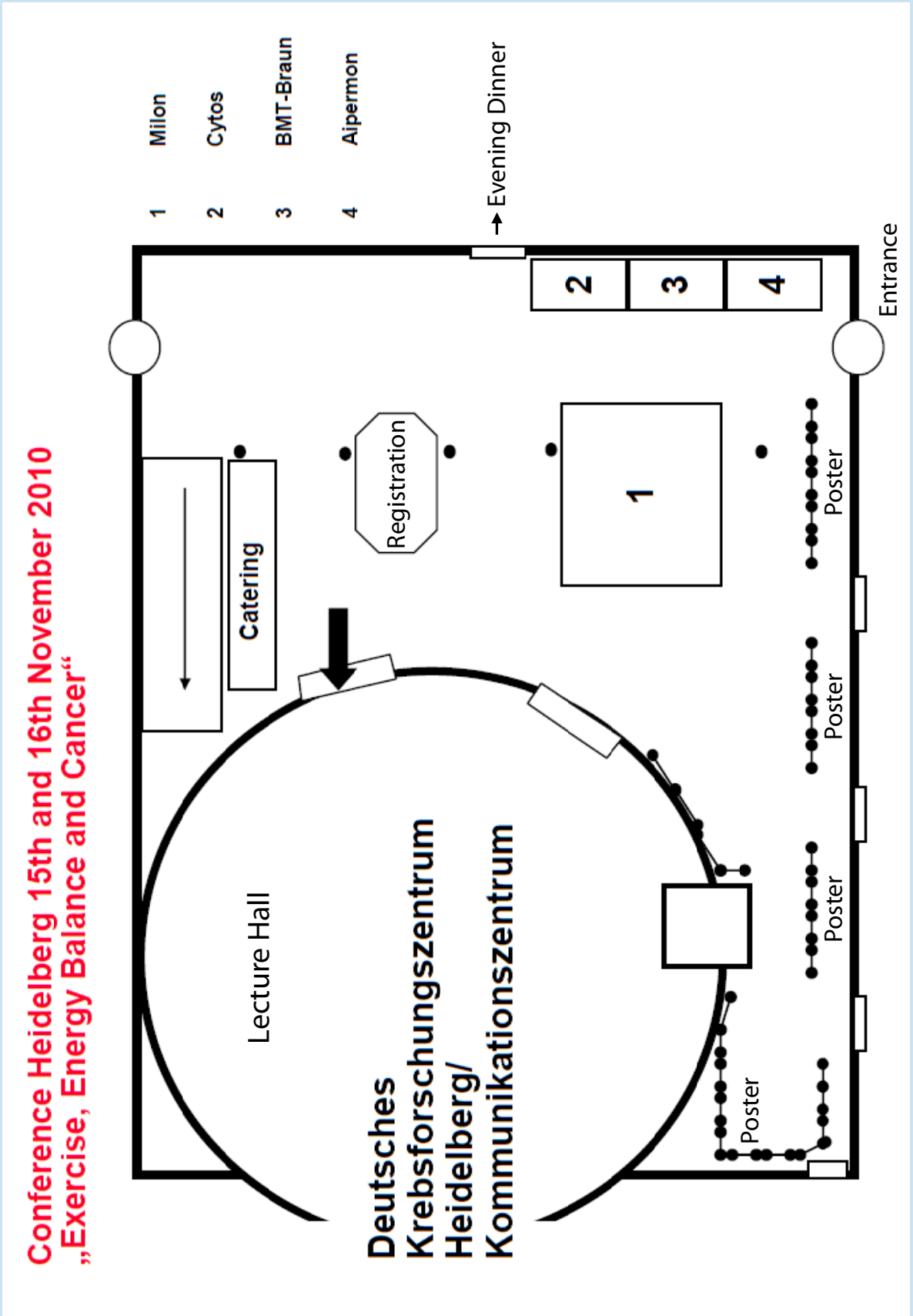
Am 24. und 31.12. Verkehr wie an Samstagen

A: bis Heidelberg, Betriebshof **B**: bis Heidelberg, Bismarckplatz

City Plan (Heidelberg)



DKFZ Communication Center Floorplan



FURTHER INFORMATION:

Breaks
During the breaks we will serve coffee, water and various snacks.

Conference - Dinners
Nov. 15th:
Dinner starts at 7:30 p.m. in the lunchroom opposite to the communication center.
(Menu: Italian Buffet)

The "Huub-Dutch-Band" will play!

Nov. 16th:
Lunch starts at 12:00 a.m. in the communication center.
(Menu: Wraps and Finger Foods)

Internet Access
During the conference days you will have the possibility to log on the Internet via W-LAN. Please use the following information to get connected to the Internet:

Name of the W-LAN Network: DKFZ Guest Netz

Username: g-nct
Password: ricexiyu

Poster Session
The Poster Session is located in conference center hall. The posters need to be placed upon the provided poster boards by Monday morning. Poster Session will be Monday 7.15 p.m. and Tuesday during lunch (between 12.00 a.m. and 1.30 p.m.).

Shuttle Service between the conference center and hotel "Weisser Bock" (only invited speakers)
For the duration of the congress a free-of-charge shuttle service between congress hotel "Weisser Bock" and conference center will be provided.

Transfer from hotel to conference center:
Monday 15th: Departure 12.00 a.m.
Tuesday 16th: Departure 7.45 a.m.

Transfer from conference center to hotel:
Monday 15th: Departure 9.00 p.m.

Talks
The Power Point presentations must be uploaded in the technician room (near the lecture hall entrance), at latest 30 minutes before the session starts.

Taxi
You need a taxi? Do not hesitate to contact our registration counters or call +49-6221-302030

You need further help?
If you need any assistance during the conference please do not hesitate to dial: +49-6221-56-4599 or contact any person at the registration counters.

Abstracts

Oral Presentations

01.)
FATIGUE MEDIATES THE RELATIONSHIP BETWEEN PHYSICAL FITNESS AND QUALITY OF LIFE IN CANCER SURVIVORS

Buffart, LM[1]; Chin A Paw, MJM[2]; Schep, G[3]; de Backer, IC[3]; Brug J[1]
[1] Department of Epidemiology & Biostatistics, EMGO Institute for Health and Care Research, *VU University Medical Center* (Amsterdam, the Netherlands), [2]Department of Public and Occupational Health, EMGO Institute for Health and Care Research, *VU University Medical Center* (Amsterdam, the Netherlands), [3]*Maxima Medical Center* (Veldhoven, the Netherlands).

Introduction
High-intensity resistance and endurance training showed to improved quality of life (QoL) in cancer patients who completed chemotherapy, directly after completion of the intervention[1] and at one year follow up.[2] The current study evaluates whether fatigue mediates the relationship between physical fitness and QoL.

Methods
From March 2002 to January 2007, patients enrolled into an 18-week high-intensity resistance and endurance training program that was implemented in the medical care for cancer patients who completed chemotherapy in the Maxima Medical Centre Veldhoven (Netherlands). Pre- and posttest measurements were conducted in 119 patients. Physical fitness (peak oxygen uptake (peakVO2) and peak power output, (peakPO)) was measured during a maximum exercise test on a cycle ergometer. Self-reported questionnaires were used to assess fatigue (Multidimensional Fatigue Inventory, MFI) and quality of life (EORTC-QLQ-C30).
We calculated residual change scores of the independent variable (physical fitness), the dependent variable (quality of life) and the mediator (fatigue). Linear regression analyses were conducted on the residual change scores, and the models were adjusted for sex, age and tumour type. The mediated effect (ab) of fatigue on the relation between physical fitness and QoL was examined using the products of coefficient method.

Results
High intensity training significantly improved peakVO_2 by 12.4 ± 14.6%, peakPO by 15.2 ± 12.1%, and general QoL by 24.9 ± 12.1%. Some subscales of the MFI were mediators in the relationship between physical fitness and general QoL. Reduced activity (ab= 5.76; SE= 2.63) and reduced motivation (3.64; SE 1.18) mediated the relationship between changes in peakVO_2 and changes in general QoL. General fatigue (ab= 0.13; SE 0.14), physical fatigue (ab= 0.14; SE 0.04), and reduced activity (ab= 0.12; SE 0.04) mediated the association between changes in PeakPO and changes in general QoL.

Discussion
Results showed that fatigue mediates the relationship between improved physical fitness and improved QoL. To confirm causal pathways, future randomized controlled trials are necessary

References
1. De Backer IC, van Breda E, Vreugdenhil G, Nijziel MR, Kester AD, Schep G. High-intensity strength training improves quality of life in cancer survivors. Acta Oncol 2007; 46: 1143-1151.
2. De Backer IC, Vreugdenhil G, Nijziel MR, Kester AD, van Breda E, Schep G. Long-term follow-up after cancer rehabilitation using high-intensity resistance training: persistent improvement of physical performance and quality of life. Br J Cancer 2008; 99: 30-36.

02.)
SOMATO-PSYCHOSOCIAL CARE PROGRAM TO IMPROVE SYMPTOMS IN CANCER PATIENTS WITH STEM CELL TRANSPLANTATION (HSCT) PRELIMINARY RESULTS OF A PROSPECTIVE NON RANDOMIZED INTERVENTION STUDY

Jahn, P[1,3]; Schmidt, H[1]; Boese, S[1]; Bauer, A[1]; Lau, A[2]; Stoll, O[2]; Schmoll, H-J[3]; Mauz-Koerholz, C[3]; Kuß, O[4]; Landenberger, M[1]
[1]Institute for Health and Nursing Science, Medical Faculty, *Martin-Luther-University Halle-Wittenberg* (Wittenberg, Germany), [2] Department Sport Science, *Martin-Luther-University Halle*, [3] University Hospital Halle (Saale, Germany), and [4]Institute for Medical Epidemiology, Biostatistics, and Informatics, Medical Faculty, *Martin-Luther-University Halle-Wittenberg* (Wittenberg, Germany).

Introduction
Patients with hematopoietic stem cell transplantation (HSCT) suffer from a range of symptoms including mucositis, nausea/emesis, fatigue and mobility/activity deficits. The study examined whether an evidence-based psychosocial interdisciplinary care program would improve global health status and reduce somatic symptoms in patients with HSCT.

Methods
The study was conducted as a single center clinical trial using a prospective non randomized design. Patients undergoing HSCT, age > 14 years provided written informed consent were eligible.
Patients in the intervention group received modified care consisting of three modules based on counseling and exercise: (1) Mobility/activity enhancement including individual endurance training, gymnastics, coordination training, (2) prevention of oral mucositis and (3) appetite enhancement/nutritional support. Control group patients received standard care.
Primary endpoint was global HRQoL measured by EORTC QLQ C30 at discharge. Secondary endpoints were symptoms like physical complaints, mobility deficits, mucositis, fatigue, appetite loss and use of resources e.g. duration of hospitalization.

Results
82 patients participated (control group n=42, intervention group n=37, average age of 52,6 ±12,7 years, 69,9 % male). Socio demographic and clinical characteristics were well balanced between both groups, except the ECOG-status which was significantly lower for patients of the intervention group ($p<0,01$).
At discharge statistically significant improvement could neither be shown for global health-related quality of life (MWD 0,84; 95%CI -8,87;10,54) nor physical functioning (MWD 6,92; 95% CI -3,51; 17,36) nor fatigue (MWD -4,04; 95%CI -15,32;7,24). However specific symptoms like dyspnea (MWD -17,05; 95%CI -30,23;-3,88) and nausea/emesis (MWD -14,81; 95%CI -26,30;-3,32) were reported to be significantly less severe in patients of the intervention group. Pain, insomnia, appetite loss, constipation/diarrhoea were not reported significantly different between both groups.
Patients of the intervention group reported significantly higher satisfaction with counselling regarding means to enhance their activity (MWD 2,44; 95%KI 1,27; 3,61) and they were significantly more active during hospitalization (activity in kcal. MWD 214,67; 95%KI 1,53;427,80). Duration of hospitalization was shorter for the intervention group (MWD -10,90; 95% KI -18,05;-3,75).

Discussion
Even though that the expected statistically significant improvement of HRQoL could not be achieved by the intervention, some symptoms were reduced and increased activity during hospitalization was achieved.
Cost beneficial effects might be achieved through shorter hospitalization periods.
Funding: Deutsche Krebshilfe / German Cancer Aid (Grant number 107498)
Registration: ClinicalTrials NCT00804817

03.)
POINT-OF-CHOICE INTERVENTIONS: A PUBLIC HEALTH APPROACH TARGETING ENERGY BALANCE.

Müller-Riemenschneider, F; Nitzschke, K, Willich, SN; Nocon, M
Institute for Social Medicine, Epidemiology and Health Economics, *Charité – University Medical Centre* (Berlin, Germany)

Introduction
Studies have shown that on a population level, relatively small energy gaps from approximately 8 to 100 kcal per day were responsible for weight gains over past years. Small increases in energy expenditure could therefore contribute to the improvement of energy balance and health on a population level. One way to introduce small increases in energy expenditure is by increasing activities of daily living. Point-of-choice prompts are informational or motivational signs which can be placed near stairs and elevators/escalators in order to increase stair use. The aim of this systematic review was to assess the effectiveness of these point-of-choice prompts for the promotion of stair use.

Methods
A systematic search of electronic databases was performed to identify studies that assessed the effectiveness of point-of-choice prompts to increase the rate of stair climbing in the population. Studies were reviewed independently by two reviewers. Publications in English that investigated the effectiveness of point-of-choice prompts were included regardless of the intervention setting, the duration of the intervention, or the kind of intervention message.

Results
The database search yielded 7132 potentially relevant articles. Of those, 25 studies fulfilled the selection criteria and were included in this systematic review. Point-of-choice prompts were predominantly posters or stair-riser banners in public traffic stations, shopping malls or office buildings. The majority of studies were before and after studies without control group. In total, 25 studies reported 42 comparisons of intervention effectiveness. Of 10 comparisons investigating elevator settings, only 3 reported a significant increase in stair climbing, whereas 28 of 32 comparisons investigating escalator settings reported a significant increase of stair climbing.

Conclusions
Although the methodological quality of most included studies was limited, they provided evidence, that point-of-choice prompts can be able to increase the rate of stair use, especially in escalator settings. In elevator settings, point-of-choice prompts seem less effective. The long-term effectiveness and the most effective message format have yet to be determined in methodologically rigorous studies.

O4.)
PROMOTION OF PHYSICAL ACTIVITY IN PEDIATRIC PATIENTS WITH A BONE TUMOR: FIRST RESULTS

Winter, CC [1,2]; Müller, C[1,2]; Hardes, J[1]; Gosheger, G[1]; Boos, J[2]; Rosenbaum, D[1]
[1]Department of Orthopedic Surgery, *University Hospital* (Muenster, Germany),
[2] Department of Pediatric Hematology and Oncology, *University Children's Hospital* (Muenster, Germany)

Introduction
Physical activity (PA) is generally reduced in patients undergoing cancer treatment. Especially malignant bone tumors are considered as a risk factor for limited physical performance[1]. In the present study PA of patients with a malignant bone tumor in the lower extremity was objectively assessed at different time points during and after treatment. Furthermore, the effect of interventions encouraging patients to be more active during inpatient stays was evaluated.

Methods
The study included 31 patients with a malignant bone tumor in the lower limb. For PA assessment a uniaxial accelerometer was used to monitor patient's step activity during one week. Patients were measured before surgery as well as 6 weeks, 3, 6, 12 and 18 months after surgery. Patients constantly treated at the University Hospital in Muenster were encouraged to participate in regular PA during inpatient stays. Patients only receiving their surgery in Muenster and returning to another hospital for any further treatment served as a control group.

Results
The lowest volume and intensity of PA was measured six weeks after surgery. Afterwards a continuous increase of PA was observed and reached significance when comparing the measurements 12 and 18 months after surgery to those before and six weeks after surgery ($p < 0.003$). Patients without intervention showed considerably less PA (not significant) as compared to those in the intervention group at all measurements. Differences between groups decreased with longer follow-up.

Discussion
In general, patients with a bone tumor in the lower limb showed a considerably reduced level of activity. Interventions were geared towards the patients' individual capabilities and preferences as well as to the stage of treatment. The results indicated that exercise interventions apparently had a positive effect on patients' daily walking activity at home. Differences between the two groups were considerable especially at measurements during treatment; however, differences were not significant.
With the cessation of treatment, the intervention ended. All patients improved their level of activity as they recovered from treatment and differences between groups were less pronounced after cessation of the intervention. Patients would probably benefit from interventions exceeding the treatment period. A sufficiently high level of activity could help prevent inactivity-induced sequela[2], e.g. osteoporosis.
Data must be considered as preliminary. Not all patients could be measured at all appointments due to impaired walking ability, disease progression or refusal to participate. Furthermore, conclusions concerning general exercise recommendations as well as the influence of tumor location or surgical procedure were not yet possible. Future research is needed to answer these questions.

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Poster Presentations

A1.)
BIOMARKERS, RISK OF COLORECTAL CANCER AND EFFECTS OF EXERCISE – WHERE ARE WE NOW?

An updated literature search

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Introduction
Physical activity/exercise (PA/EX) is believed to be associated with a 30 to 50 percent decreased risk of colorectal cancer (CRC); the mechanisms leading to beneficial effects, however, still are incompletely understood. Biomarkers as short/intermediate term modifiable and quantifiable risk parameters believed to be directly or indirectly implicated in pathways leading to tumor growth may play an important role in elucidating these mechanisms. Insulin, insulin-like growth factor (IGF) and its binding proteins (IGFBP), C-reactive protein (CRP), markers of proliferation and apoptosis (crypt height, Ki67, apoptosois regulating proteins e.g. Bax/Bcl-2), immune parameters such as interleukins (IL)/IL- receptor antagonists, fecal bile acids (FBA), mucosal prostaglandins (mPG) and oxidative DNA damage products (8-oxo-deoxyguanosine)(8-oxo-dG) have been investigated recently, but lacking is a more comprehensive overview. In order to establish a better understanding of this topic, we present an updated literature search with special regard to the effects of PA/EX on these biomarkers in primary (PP) and tertiary prevention (TP), i.e among cancer survivors.

Methods
A MEDLINE and COCHRANE based search (Jan 2005 to June 2010) was performed with the keywords: biomarkers as specified, CRC, cancer risk, PA, EX, PP, TP, colon cancer survivors. Included were prospective cohort/case control/cross sectional trials (CO/CC/CS) and randomized controlled trials (RCT)(intervention studies) with and without concomitant determination of biomarkers.

Results
N=20 papers fulfilled the criteria, among them five RCTs, the remainder being CO,CC or CS. N=3 investigated associations between IGF-1/IGFBP-3, CRP and/or association with polymorphisms showing a significant decrease in the more active groups and/or an association of a higher risk with an altered genotype; one CS found decreased FBA and triglycerides in the more active groups. In two RCTs a small, but significant decrease of proliferation markers (crypt heights) was found, another RCT from the same group demonstrated an increase of apoptotic regulating proteins following defined EX, whereas CRP and mPG seem to be unchanged as shown by two other RCTs. All studies whether or not determining biomarkers found that PA/EX were associated with a significantly decreased cancer risk (OR 0.13- 0.63). In contrast to PP only few studies presently are available in TP. Three CO prospectively studied outcomes in cancer survivors finding higher overall and disease-free survival in the more active groups depending on the PA level as assessed in metabolic equvalent task (MET)-hours per week. Compared to PP a decreased risk of relapse was in a similar range (OR 0.3 to 0.5). Studies with biomarker determination are not yet available in this category, except for two small short term RCTs one using urinary excretion of 8-oxo-dG, the other IL-1/IL-1 antagonist profiles showing a 30 percent decrease of 8-oxo-dG and 28 percent decrease of IL -1 receptor antagonist, respectively, following moderate EX.

Discussion
The present evidence further supports beneficial effects of PA/EX in PP and the view that modification of selected biomarkers by exercise interventions is an adequate tool to better understand underlying mechanisms. Whether this is also true in TP is possible, but has to be further investigated in prospective studies with concomitant determination of appropriate biomarkers.

A2.)
PHYSICAL AND PSYCHOSOCIAL BENEFITS OF YOGA IN CANCER PATIENTS AND SURVIVORS, A SYSTEMATIC REVIEW OF RANDOMIZED CONTROLLED TRIALS.

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Introduction
To systematically review the evidence from randomized controlled trials (RCT) examining physical and psychosocial effects of yoga in cancer patients and survivors.

Methods
A systematic literature search in ten databases was conducted up to April 2010. We included studies with an RCT design that focused on cancer patients or survivors, included a physical component in the yoga program and a non-exercise or waitlist control group, and evaluated physical and/or psychosocial outcomes. Two independent raters conducted the quality rating using a Delphi list.[1] Studies were considered to be high quality when they had at least 50% of the total possible score.[2] The level of scientific evidence was determined using a rating system that takes into account the number, the quality and consistency of study outcomes.

Results
Twelve RCTs were included in the review, of which 11 included breast cancer patients. The quality score of the studies ranged from 22% to 78%, and seven were scored as high methodological quality. The included studies evaluated nineteen physical and twenty psychosocial outcomes. Of the outcomes studied in four or more studies, we found strong evidence that yoga improves general quality of life and emotional function. Inconsistent evidence was found for effects regarding distress, anxiety, depression, and pain. We found no evidence for improvements in fatigue and sleep.

Discussion
This systematic review of RCTs showed that yoga has beneficial effects on general quality of life and emotional function in breast cancer patients and survivors. Evidence for distress, anxiety, depression and pain is emerging, but currently inconsistent. There was insufficient evidence regarding the effects of yoga on physical outcomes.

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A3.)
PROGRESSIVE RESISTANCE TRAINING AND CANCER TESTIS (PROTRACT) - EFFICACY OF RESISTANCE TRAINING ON MUSCLE FUNCTION, MORPHOLOGY AND INFLAMMATION IN TESTICULAR CANCER PATIENTS UNDERGOING CHEMOTHERAPY: DESIGN OF A RANDOMIZED CONTROLLED TRIAL

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Introduction

Testicular cancer patients (TCP) in chemotherapy with bleomycin, etoposide and cisplatin (BEP) experience severe adverse effects[1], mainly caused by the toxicity of cisplatin, and TCP often report significant muscular fatigue during and after treatment[2]. One possible explanation of this fatigue development could be treatment-induced cachexia, which is involved in both morbidity and mortality in cancer patients in general[3]. Chemotherapy is considered to be a potent contributor[4] til cachexia in cancer patients however limited information exists concerning the patho-physiological effects of antineoplastic agents on the skeletal musculature. *Exercise-oncology* is emerging as a new field within cancer research[5], and exercise concomitant to medical treatment could potentially counteract cachexia in cancer patients[4]. Chemotherapy and exercise may induce contradictory signals within the skeletal musculature, and the possible interaction between treatment-induced atrophy signals and simultanious exercise-induced hypertrophy signals is very interesting to investigate, yet so far no muscular data has been presented from exercise studies in cancer patients undergoing chemotherapy. The primary aim of the study is to investigate the effects of BEP-treatment on the skeletal musculature, and to examine whether the treatment-induced muscular detereoration can be attenuated or even reversed by high intensity progressive resistance training (HIPRT) concomitant to the antineoplastic treatment.

Design/Methods

The PROTRACT study is a randomized controlled trial in 30 testicular cancer patients undergoing BEP chemotherapy. Participants will be randomised to a 12-week HIPRT programme (STR) iniatiated at the onset of treatment, or receive standard care (UNT). 15 healthy matched control subjects (CON) will complete the same HIPRT programme. All participants will take part in 4 assessment rounds (baseline, 4 wks, 12 wks, 24 wks) including muscle biopsies, maximum muscle strength tests, whole body DXA scan and blood samples. Modern physiological methods and analyses will be used to evaluate muscle morphology, muscle function, body composition and systemic inflammation. *Primary outcome*: mean fibre area measured by histochemical analyses of muscle biopsies. Also, the muscle biopsies are analysed for fibre type composition, satellite cells and levels of protein and mRNA expression of intracellular mediators of protein turnover. Secondary outcomes: maximum muscle strength and muscle power measured by maximum voluntary contraction (MVC) and leg-extensor-power (LEP) tests, body composition assessed by DXA scan, and systemic inflammation analysed by circulating inflammatory markers, lipid and glucose metabolism in blood samples. Health related Quality of Life (QoL) will be assesed by validated questionaires (EORTC, SF-36).

Discussion

This study investigates the muscular effects of HIPRT in TCP and the biological effects of antineoplastic agents on the skeletal musculature. The study investigates whether TCP, who experience strong cytotoxicity, can benefit from HIPRT during treatment. Also, by comparing TCP to a healthy control group, the study investigates which physiological pathways BEP-treatment might affect, and how this influences the muscular adaptation to progressive resistance training. A better knowlegde of the causal interaction between cytotoxic-induced physiological impairment and exercise-induced improvement is imperative for the future development of optimal individual exercise programs for cancer patients during chemotherapy.

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A4.)
EFFECTS OF MASSAGE ON HEART RATE VARIABILITY IN BREAST CANCER SURVIVORS AFTER EXERCISE

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Introduction

The purpose of this study was to investigate the immediate effects of massage as a recovery method after a session of endurance-aerobic exercise. After breast cancer treatment, survivors have cardiotoxicity and reduced aerobic capacity that affect their quality of life. The effects of using massage to improve transient vegetative imbalance induced by exercise session in breast cancer women with fatigue are not known.

Methodology

Nineteen breast cancer survivors (age: 49.1 ± 7.2 years; weight: 72.39 ± 8.2 kg.; height: 160.45 ± 5,4 cm.; IMC: 27.8 ± 4.0) with breast cancer grade I-II and a score between 4 - 6 in Borg's scale after a physical activity session. Crossover study in which patients received either the experimental treatment (manual therapy protocol) or a placebo intervention (chat about general nutrition and life style guidance), like a recovery methods after exercise program based on strength and cardiorespiratory endurance. Heart rate variability measured by 5 minutes holter recording was used after exercise (firt measurement) and after recovery strategie (second measurement). Separate analyses of variance (ANOVA) were performed with each dependent variable. The hypothesis of interest was group x

time interaction. Data were analyzed with the SPSS package version 16.0 (SPSS Inc, Chicago, IL).

Results

The ANOVA showed a significant group x time interaction for HRV temporal domains as SDNN (F = 4.484, P <0.05), RMSSD (F = 6.123, P = .024), (F = 5.101, P =0 .036) but not for HRV index (F = 3.451, P = 0.080). In the frequency domain the ANOVA showed a significant group x time interaction in total power (F = 9.705, P =0 .008), HF domain (F=7.571, p=0.013) and ratio LF/HF (F=4.652, P=0.045) but not for LF domain (F=0.014, P=0.907).

Discussion

The application of a single session of manual therapy after aerobic-resistance exercise session produces immediate increase o heart rate variability in temporal and frequency domains. These results confirm ability of massage to improve recovery process after exercise. A massage applied after moderate intensity exercise help to restore autonomic balance over cardiac function Better recovery processes after exercise could increase exercise programs adherence.

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A5.)
EFFECTS OF EXERCISE TRAINING ON THE COURSE OF GRAFT VS HOST DISEASE IN A MURINE MODEL OF ALLOGENEIC HEMATOPOIETIC STEM CELL TRANSPLANTATION.

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Introduction

Hematopoietic stem cell transplantation (HSCT) is used worldwide for the treatment of blood malignancies, immunodeficiencies, aplasias and inborn genetic diseases. Graft vs. host disease (GVHD) is a major complication of HSCT. Although exercise training is a promising intervention against numerous side effects of anti-cancer treatment (e.g. fatigue), it remains to be determined if (and how) it does affect the course of GVHD**.** The purpose of our study was to evaluate the effects of pre- and post-HSCT aerobic training in a murine GVHD model, on several aspects of GVHD: clinical course, post-HSCT immune cell reconstitution and pathological involvement of target organs.

Methods

We used a minor-HA, CD8-driven murine model of GVHD, donor C3H.SW into recipients C57BL/6J. Twenty female C57BL/6J mice (19-23 g, 7-8 wk old) were randomly assigned to each of three groups: pre-HSCT exercise group (PRE-EX; N=5), post-HSCT exercise group (POST-EX; N=5) and sedentary control group (CONT, N=10). In the PRE-EX group, aerobic training lasted 8 wk and ended the day before HSCT. It consisted of treadmill running at moderate intensities (23-32 cm/s, 25% incline), 1 h/day, and 5 days/wk. In the POST-EX group, aerobic training started the day after HSCT and lasted 12 wk. Controls did not perform any type of regular treadmill training before or after HSCT. The day after irradiation, mice received intravenously 10 million marrow cells plus 30 million splenocytes from the donor male mice. After HSCT, mice were weighted daily, and monitored for signs of GVHD course and survival. At days 21 and 54 post-HSCT, and in the day of death, we collected blood samples for analysis of immune cell reconstitution. Mice were sacrificed and their organs (gut, skin, liver) removed upon appearance of death signs or 12 wk post-HSCT.

Results

Mice in the POST-EX group maintained higher weight values than the other two groups in the first two weeks following HSCT (e.g. at day 11 post-HSCT, weight equaled 97.0±4.4%, 103.4±5.2% and 96.4±10.0% of the weight before irradiation in PRE-EX, POST-EX and CONT respectively; P=0.024 for the POST-EX vs. CONT comparison). Scores indicative of body position and hair manifestation of GVHD showed worst values in CONT than in POST-EX during wks 9-12 post-HSCT (P<0.05 for all between-group comparisons). However, scores indicative of skin manifestation of the disease showed worst values in PRE-EX than in CONT in weeks 9-12 post-HSCT (P<0.05). We found no between-group differences in animals' spontaneous activity (P>0.05). One mouse in CONT died of the disease vs. none in the other two groups.

Except for CD4 at 21 days post-HSCT, for which mean values were significantly higher (P= 0.021) in PRE-EX than in CONT [(mean±SD) 46.8±15.4 vs. 28.6±29.8 cells/μL respectively], we found no differences between-group (P>0.05) in variables indicative of immune cell reconstitution (total leucocyte count, B220, CD3, CD4, CD8, MAC1) after HSCT.

Discussion

Our preliminary results show that regular aerobic exercise, at least when performed after HSCT, might exert a beneficial effect in the clinical course of GVHD, with no deleterious effect in immune reconstitution. Future studies are needed in order to determine which is the 'exercise threshold' (intensity, duration) for eliciting the highest benefits in the course of the disease.

A6.)
PHYSICAL INTERVENTION PROGRAM FOR CHILDREN AND ADOLESCENTS DURING HEMATOPOIETIC STEM CELL TRANSPLANTATION

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Introduction

Hematopoietic stem cell transplantation (HSCT) is a promising treatment for some severe hematological diseases[1]. However, it is associated with many complications and adverse effects on patients' physical performance[2]. Several studies show reduced muscle strength, dysfunction of the cardiovascular system, obesity, fatigue[3,4] and decreased quality of life[5] (QoI) in childhood cancer patients. Based on this knowledge we developed a modularly physical intervention program especially for children and adolescents during HSCT.

Methods
From January 2009 until January 2010 nine patients with different diagnoses participated in our study. During their inpatient hospitalization the patients performed 3 weekly sessions for about 30 min. The intervention included: game console-based training using Nintendo Wii®, age-specific resistance training and sessions of body awareness. Physical performance was determined using a hand-held dynamometer (muscle strength), the timed-up and down stairs test (TUDS) and the timed one-legged stance (TOLS). The KINDL® - questionnaire (incl. oncology-modul) was used to assess the quality of life. Paired t-test was used to compare the mean scores of t1 (baseline, time for admission) and t2 (time of discharge).

Results
Our results demonstrate the limited motor performance already at baseline compared to healthy peers. Due to the intervention physical performance was nearly maintained. Performance in the TOLS even increased significantly after training ($p = .035$). Only knee flexion showed a significant decrease ($p = .049$). Significant improvements in QoL were noted in the dimension "mental well-being" in parents' self-report ($p = .027$) and "mental health" in patients' self-report ($p = .004$). Finally, the patients' QoL is almost on healthy level. All patients completed the intervention program without any complications.

Discussion
The current innovative intervention design using game console-based training, age specific resistance training and sessions of body awareness proved to be a successful method in counteracting physical and psychological impairment during acute transplantation phase. Beneficial effects appear on muscle strength, functional mobility and quality of life. In addition, the presented results underline the need of exercise interventions in pediatric cancer patients already during the inpatient hospitalization. Future studies using controlled design in larger samples size are necessary.

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A7.)
PREVENTING PHYSICAL INACTIVITY USING A MOBILE CHEST MODULE

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Introduction
According the KiGGS study 15% of the German teenagers aged 3 to 17 are overweighted.[1] More than a third of these suffer from obesity. This is mainly caused by physical inactivity. Therefore these teenagers needed to be motivated for continuous activity.

Methods
The mobile chest module continuously measures three-dimensional acceleration of the torso and the user's electrocardiogram. These data are transmitted via a 2.4GHz wireless connection. In [2] and [3] algorithms have been proposed to measure the current heart rate and to detect basic motion patterns. We extended these algorithms to detect more complex motions, currently knee bends and press-ups. Their detection rates have been tested among 5 adults and 15 adolescents. A test suite has been used to automatically determine the detection rate and the optimal parameter set.

Furthermore a software system called training instructor has been developed to guide the player within a certain training plan. It motivates the users with a voice response. The heart rate is monitored to prevent any overload and to ensure a sufficient training stimulus.

Results
The conducted tests indicate that more than 90% of the push ups and knee bends can be detected. Obviously the detection rate increases the more the users get used to the detection algorithms. This is caused by the high variability of the motion patterns. Also the users describe the software as motivating and entertaining which is important to motivate them for further usage of the training instructor.

Discussion
Our recent work aimed at the prevention of the overweight and obesity. The detection can easily be adapted to more motion patterns. All detection algorithms developed so far could be implemented within the chest module to ensure a longer battery life time and a more robust transmission. In addition one can clearly see that there are many other possible applications for the chest module. Preventing physical inactivity is highly relevant within the field of industrial medicine as well as for patients with chronic and prolonged diseases.

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A8.)
IS THERE A NEED FOR PHYSICAL ACTIVITY INTERVENTIONS IN GERMAN BREAST CANCER PATIENTS? FINDINGS FROM THE MARIE/MARIE-PLUS STUDY

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Introduction
There is convincing evidence for the positive physical and mental effects of physical activity (PA) in relation to breast cancer.[1] PA is increasingly accepted as beneficial factor during breast cancer therapy and can add to the improvement of therapy- and disease-related symptoms.[2] Furthermore, first observational studies suggest improved overall survival and reduced rates of relapse.[3] However, little is known about the PA behavior following breast cancer diagnosis. Our objectives were to describe PA in the course of breast cancer including sports and active transportation and to identify factors associated with these activities.

Methods
We used data from the German MARIE/MARIEplus study including 1,067 postmenopausal breast cancer patients aged 50 to 75 from the Rhine-Neckar-Karlsruhe region. Patients were asked about PA before diagnosis, during therapy and one year after surgery. We calculated MET-hours/week based on quantitative information about walking, bicycling for transportation purposes and sports. Factors associated with these activities were identified using logistic regression.

Results
PA decreased significantly during breast cancer therapy from a median of 36 to 14 MET-hours/week ($p<0.001$). While the bigger part of patients still walked during therapy (75% vs. 90% before diagnosis), considerably fewer patients used a bicycle for transportation purposes during this phase (19% vs. 57%) and only a small proportion of patients still exercised (15% vs. 65%; all $p<0.001$). PA before diagnosis was positively associated with PA after diagnosis. Chemo-/radiotherapy was negatively associated with sports (OR: 0.35 [0.17-0.73]), but positively associated with walking during therapy (OR: 2.08 [1.04-4.15]). While sociodemographic factors showed weak associations with PA, participation in rehabilitation increased the likelihood for bicycling (OR: 1.48 [1.06-2.09]) and sports one year after surgery (OR: 1.88 [1.38-2.58]).

Discussion
The majority of breast cancer patients stopped exercising and bicycling during therapy. In the light of this drastic decline in PA, there is a need for programs promoting exercise and PA in the total patient population. Increase of participation in rehabilitation might help to increase the proportion of patients who bicycle and exercise. It can be assumed that the implementation of appropriate interventions can clearly contribute to the improvement of the quality of life in breast cancer patients.

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A9.)
EFFECTS OF DIETARY WEIGHT LOSS AND EXERCISE ON INFLAMMATION IN OVERWEIGHT/OBESE POSTMENOPAUSAL WOMEN

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Introduction
Obesity and sedentary lifestyles are modifiable risk factors for several types of cancer; inflammation is a potential mechanism explaining the associations. Obesity and a sedentary lifestyle are associated with increased levels of inflammatory markers,[1] while dietary weight loss and exercise reduce inflammation.[2-4] Although prior studies have shown that exercise reduces inflammation,[3,4] the necessity for weight loss to achieve the anti-inflammatory effect is unknown. The few studies comparing long-term (≥12 months), individual and combined effects of exercise and dietary weight loss on inflammation have shown mixed results.[5,6]

Methods
Sedentary, overweight/obese (BMI $\geq$ 25.0 kg/m^2) postmenopausal women aged 50-75 years were randomized to: reduced calorie-diet with goal 10% weight loss (n=118), moderate/vigorous intensity aerobic exercise (225 min/week, n=117), combined diet + exercise (n=116), or control (n=87). C-reactive protein (CRP), serum amyloid A (SAA), interleukin-6 (IL-6), and leukocyte and neutrophil counts were assessed at baseline and 12 months, with 91% retention. Inflammation changes were compared across groups using the generalized estimating equation models.

Results
Study retention was 91%. The diet, exercise, and diet + exercise groups lost a mean 8.5, 2.4, and 10.8% of baseline body weight, respectively. Exercisers met a mean 84.7% of goal, 172 minutes/week. At baseline, the overall geometric means of inflammatory biomarkers were CRP (2.3 mg/L), SAA (5.2 mg/L), IL-6 (1.4 pg/mL), and leukocyte (5710/μL) and neutrophil (3269/μL) counts. The diet and diet + exercise groups decreased CRP (percent changes: Δ_D= 37.8%; Δ_{D+E}= 45.0%), SAA (Δ_D= 22.5%; Δ_{D+E}= 22.4%), IL-6 (Δ_D= 22.1%; Δ_{D+E}= 24.1%), and leukocyte (Δ_D= 7.1%; Δ_{D+E}= 9.2%) and neutrophil (Δ_D= 10.9%; Δ_{D+E}= 11.0%) counts compared with controls (all $p\leq0.01$), while there were no differences in exercisers (vs. controls). Participants who lost ≥5% of body weight reduced CRP (Δ_D= 51.2%; Δ_E= 27.8%; Δ_{D+E}= 52.0%) independent of their intervention assignments (vs. controls, all $p<0.01$).

Discussion
We found that a 12-month dietary weight loss intervention with or without exercise significantly reduced several markers of inflammation. Although the overall effect of exercise without a dietary intervention on inflammation was not significant, women in the exercise-only intervention who lost more than 5% of baseline weight significantly reduced CRP. These results suggest that lifestyle change to produce modest amounts of weight loss can have large beneficial effects on clinically-relevant markers of inflammation.

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A10.)
ANTHROPOMETRY, AGE AT DIAGNOSIS AND BREAST CANCER RISK ACCORDING TO OESTROGEN RECEPTOR STATUS IN THE EUROPEAN PROSPECTIVE INVESTIGATION INTO CANCER AND NUTRITION.

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Introduction
Associations of anthropometric factors with breast cancer risk are complex and underlying mechanisms remain poorly defined. Epidemiologic evidence indicates the effect of excess adiposity possibly differs by age and oestrogen receptor (ER) expression in the tumours.

Methods
In a prospective cohort analysis from EPIC (European Prospective Investigation into Cancer and Nutrition) using all female participants with no history of invasive cancer, associations of age at index diagnosis (<50, 50–55, 55-60, 60-65 and >65 years) and anthropometry (body-mass-index [BMI], waist and hip circumferences) with ER-status [ER-positive (n=3823), ER-negative (n=936)] were investigated. Heterogeneity between risk estimates was assessed within age-bands using competing risk analysis with Cox proportional hazards models stratified by age and study centre and adjusted for height.

Results
Per 5 unit increase in BMI or 5cm increase in hip circumference, a direct risk association was observed for ER-positive cases >65 years at diagnosis [BMI: HR=1.18(95%CI 1.11–1.26); Hip: HR=1.09(95%CI 1.06–1.13)]. In women aged <50 years at diagnosis, a decreased risk for ER+ tumours was observed for every 5 unit increase in BMI [0.81(95%CI 0.70–0.94)]. Heterogeneity between ER+ and ER- breast cancer was observed in women diagnosed after 65 years of age (P_{het}=0.03). Direct associations of anthropometry were limited to ER+ tumours in postmenopausal HRT users and never users in women >65 years at diagnosis.

Conclusion
Associations of adiposity with overall breast cancer risk appear to be generally driven by ER-positive tumours. The risk of ER+ breast cancer with excess adipose tissue may be explained by increased levels of circulating oestrogen.

1. Conflict of Interest
None Disclosed

2. Funding
Research relating to this abstract was funded by Graduiertenkolleg 793, the University of Heidelberg, Germany.

A11.)
PHYSICAL AND PSYCHOLOGICAL EFFECTS OF A COMBINED EXERCISE PROGRAM ON LYMPHOMA PATIENTS DURING TREATMENT

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Introduction
Exercise seems to be a promising strategy to reduce physical or psychological side effects of chemotherapy in cancer patients. Previous studies in patients with solid tumor (e.g. breast cancer) have shown that exercise can improve physical conditions as well as quality of life (QoL).[1] Until now, there is less known about physical activity in patients with lymphoma. The aim of our study was to evaluate the influence of physical activity on aerobic endurance capacity, postural control and QoL during chemotherapy in these patients.

Methods
Thirty-five patients with malignant lymphoma undergoing chemotherapy were randomly assigned to an intervention group (IG, n=19) or a control group (CG, n=16). The IG participated in a defined exercise program including aerobic endurance, strength and sensorimotor training, twice a week. Patients were assessed four times over a total period of 36 weeks: before chemotherapy (T0), after 12 (T1), 24 (T2) and 36 weeks (T3). Endurance capacity was measured by determination of the individual anaerobic threshold (IAT) of each patient during an exercise electrocardiogram (ECG). Static postural control was evaluated using a force plate recording sway paths of center of pressure (COP) during mono- and bipedal stance (patients standing either directly on the force plate [condition A] or on a foam pad [condition B]); failed attempts were documented as well. In addition, we analyzed QoL by EORTC QLQ-C30 version 3.0.

Results
We present the results after 12 weeks intervention from T0 to T1 as followed: The median patient' age was 51 years (range 19-74) and most patients were male (71% vs. 29%, respectively). The diagnosis of B-NHL (54%) was pronounced in this cohort, followed by M. Hodgkin (17%) and multiple Myeloma (17%). Most of the patients (54%) had an advanced disease stage III/IV by Ann Arbor (89.5%). At baseline there were no significant differences in patient characteristics, endurance capacity or postural control between both groups. After 12 weeks intervention patients in the IG showed no significant difference (p=0.0517) in their performance

at the IAT in comparison with patients in the CG (mean=87 watts [IG] vs. mean=78 watts [CG]). Although there was no significant difference in cumulative sway paths in the IG compared to the CG in both bipedal balance tasks (p=0.079 [A]; p=0.06 [B]), the CG showed a significant increase (43%; p=0.038) in failed attempts in the monopedal condition B, indicating a decrease in postural control for the CG during therapy. At baseline IG patients had a significant lower mean QoL- score (42/100, range 17-83) compared to patients of the CG (65/100 [42-92]; p=0.002) but improved their QoL- score at T1 significantly (53/100 [17-83]; p=0.042). In contrast, in the CG the QoL- score at T1 decreased (55/100 [17-92]) with a statistically trend p=0.086.

Discussion
Side effects of chemotherapy are frequent in cancer patients. Therapy-induced peripheral neuropathy can affect postural control in cancer patients. We demonstrate that a combined exercise program during chemotherapy may prevent an impairment of postural control in these patients. However, more data is needed to further evaluate possible effects of physical activity on symptoms of peripheral neuropathy over a longer period (>36 weeks). In addition, we highlight the improvement of QoL and well-being in the IG with lymphoma during chemotherapy undergoing a defined exercise program. Our data support the paradigm shift to encourage cancer patients under chemotherapy to take part in physical acticivity.
Conflict of interest: educational grant AMGEN

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A12.)
INTERACTIV – AN EXPLORATORY STUDY OF THE UTILIZATION OF A GAME CONSOLE TO PROMOTE PHYSICAL ACTIVATION OF ADULT CANCER PATIENTS DURING HOSPITALIZATION

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Introduction
The positive influence of physical exercise to improve patient-reported outcomes, i.e. symptoms, function or quality of life in cancer patients is well established (Knols, Aaronson, Uebelhart, Fransen & Aufdemkampe 2005; Schmitz et al., 2005). However, it remains challenging to motivate patients to adhere to physical exercise plans (Baumann, 2005). The aim of this study was to explore the use of Nintendo Wii® (Redmond, Washington) game console to motivate hospitalized adult cancer patients to apply physical activity during treatment periods.

Methods
Within this exploratory study a mixed method approach including descriptive statistics and Mayring´s qualitative data evaluation method was applied. Adult cancer patients were included as a convenient sample (N=7). All patients received physical training for five days/30 minutes per day with Nintendo Wii®. After the last training session patients were interviewed using a semi structured guideline. All participants were inpatients at the Department of Radiation Oncology, University Hospital Halle (Saale).

Results
In general, the use of an activating game console in a hospital environment has been evaluated positively. Participants showed a high degree of acceptance using this kind of physical activation. Due to the Nintendo Wii® the majority of individuals also felt stimulated to become physically active during hospitalization. Furthermore, all patients lost time awareness and felt distracted from hospital daily routine. A majority of the patients reported an improved mood state due to the game sessions.
Discussion
In summary, our study showed that an activating game console in the treatment of cancer patients in a hospital setting can result in distraction from daily hospital routines and increases the patients´ motivation to be physically active. However, for some patients the training with game console might be unaccustomed within the hospital environment.
All participants confirmed that this kind of physical activity is pleasant and results in positive mood states. Although participants reported good handling of the technical device and only some had problems with the game (software). Thus, the acceptance of the game console might be influenced by age and routine in using a computer.

A13.)
IMPACT OF A 12-WEEK STRENGTH TRAINING INTERVENTION ON QUALITY OF LIFE AND MUSCLE STRENGTH IN BREAST CANCER PATIENTS UNDERGOING CYTOTOXIC THERAPY

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Introduction
In Germany, statistically one in nine women faces the diagnosis breast cancer during the course of her life[1]. Treatment and its side effects mean a drastic reduction in quality of life and a decrease of muscular strength. Numerous studies showed positive effects of physical exercise on quality of life in cancer patients[2]. Most studies focused on endurance training programs after, but not during completion of acute therapy. Only few studies explored the feasibility and effect of resistance training on cancer patients[3]. The presented project examined the impact of a structured and supervised resistance training program on quality of life, fatigue and muscular strength in patients with breast cancer undergoing chemotherapy.

Methods
37 breast cancer patients were included in the project. In the intervention group IG (mean age 53.95 ± 9.29) 21 of them completed a twice weekly supervised resistance training program over twelve weeks. The training included seven upper and lower body exercises at a load of 70-75% MVC. Patients in the control group CG (n=12, mean age 48.17±10.25) did not participate. Before and after the program, muscular strength of the upper and lower body was measured using the Isomed 2000. The European Organization for Research and Treatment of Cancer (EORTC) Quality of Life Questionnaires (QLQ) EORTC QLQ-C30 and EORTC BR23 (breast cancer specific) were used to measure functional status and quality of life.
Results
The intervention improved muscular strength in the IG: right arm strength over the intervention period showed a decrease of 2.58 (±5.47) newton

meters in the CG compared to an increase of 2.52 (±4.26) newton meters in the IG (p= .005 between groups). GQoL-score showed a non-significant increase in the IG, while decrease of GQoL in the CG achieved a significant level (p= .001 between groups). Fatigue scores decreased in IG and increased in CG (p< .001 between groups).

Discussion
No adverse effects occurred due to the training program although participants started training as early as six weeks after surgery. All participants of the IG continued physical exercise after the end of the project, many of them continuing with resistance training. The extremely positive results show the importance of resistance training as part of complementary treatment for cancer patients undergoing chemotherapy. Particularly noteworthy is the preservation of muscular strength even during cytotoxic therapy. Statement of the results is limited by the relatively small number of subjects and the lack of randomization. The results of this pilot project will have to be confirmed via large-scale studies.

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A14.)
THE ROLE OF BODY WEIGHT AND BODY COMPOSITION IN OBSERVED ASSOCIATIONS BETWEEN PHYSICAL ACTIVITY AND ENDOGENOUS SEX HORMONE LEVELS AFTER MENOPAUSE

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Introduction
There is strong evidence that women have a lower risk of postmenopausal breast cancer when they are physically active.[1] The biological mechanisms responsible for this preventive effect are yet poorly understood. However, it has been hypothesized that physical activity lowers breast cancer risk at least in part via hormonal pathways.[2] Thus, we investigated whether recent physical activity was associated with lower levels of endogenous sex hormones after menopause. As postmenopausal production of sex hormones takes place primarily in women's adipose tissue, we especially focused on the question to what extent our observed associations were influenced by factors related to body weight and body composition.

Methods
A cross-sectional study among 1,260 postmenopausal women was conducted. Generalized linear models were used to compare levels of total leisure-time physical activity, sports activities, day-to-day bicycling, and day-to-day walking with levels of sex hormones and sex hormone-binding globulin (SHBG). Models were adjusted for several reproductive and lifestyle factors known or suspected to influence postmenopausal hormone levels. A special focus was on confounding and effect modification by BMI, body weight, waist circumference, hip circumference, and waist-to-hip ratio.

Results
Higher sports activity levels were significantly associated with lower levels of estrone and total and free testosterone in multivariate adjusted models. After additional adjustment for BMI (or any other factor related to body weight or body composition), associations with estrone and free testosterone were attenuated; the association with total testosterone remained unchanged. No physical activity variable was significantly related to total and free estradiol, androstenedione, or SHBG. We did not observe effect modification by any factor related to body weight or body composition.

Discussion
Our data suggest that higher levels of sports activity may lead to lower levels of estrone and testosterone (total and free) in postmenopausal women. While associations with estrone and free testosterone appear to be largely mediated by factors related to body weight and body composition, the association with total testosterone appears to be mainly independent of these factors. Our observed BMI-independent associations with estrone and testosterone (especially with total testosterone) could at least partly explain why physical activity has been frequently reported to be preventive for postmenopausal breast cancer, even after accounting for BMI. More basic research coupled with RCTs on physical activity and endogenous sex hormones would however be desirable to further investigate this hypothesis.

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A15.)
DESIGN OF THE EXERCISE INTERVENTION AFTER STEM CELL TRANSPLANTATION (EXIST) STUDY. A RANDOMIZED CONTROLLED TRIAL TO EVALUATE THE EFFECTIVENESS AND COST-EFFECTIVENESS OF A INDIVIDUALIZED HIGH INTENSITY PHYSICAL EXERCISE PROGRAM ON FITNESS AND FATIGUE IN PATIENTS WITH MULTIPLE MYELOMA OR (NON-)HODGKIN'S LYMPHOMA TREATED WITH HIGH DOSE CHEMOTHERAPY AND AUTOLOGOUS STEM CELL TRANSPLANTATION.

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Introduction
High-dose chemotherapy combined with autologous stem cell transplantation can cause persistent fatigue[1-3] and a reduced global quality of life, role and physical function[4]. Physical exercise interventions may be beneficial for physical fitness, fatigue and quality of life[5;6]. However, the trials conducted so far to test the effects of physical exercise interventions in this group of patients were of poor to moderate methodological quality[5;6] and economic evaluations are lacking.

Methods
A multicenter, prospective, single blind randomized controlled trial will be performed in patients with multiple myeloma and (non-)Hodgkin's lymphoma recently treated with high-dose chemotherapy and autologous stem cell transplantation. We aim to recruit 120 patients within an inclusion period of 2 years at 7 hospitals in The Netherlands. The patients will be randomly assigned to one of two groups: (1) intervention plus usual care; or (2) usual care. The intervention consists of an 18-week individualized supervised high-intensity exercise program and counselling. The primary outcomes (cardiorespiratory fitness, muscle strength and fatigue) and secondary outcomes are assessed at baseline, at completion of the intervention and at 12 months follow-up.

Discussion
The strengths of this study include the solid trial design with clearly defined research groups and standardized outcome measures, the inclusion of an economic evaluation and the inclusion of both resistance and endurance exercise in the intervention program.

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A16.)
SAFETY AND FEASIBILITY OF A COMBINED EXERCISE INTERVENTION FOR LUNG CANCER WITH ADVANCED DISEASE UNDERGOING CHEMOTHERAPY: A PILOT STUDY

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Introduction
Existing knowledge on the effect of physical activity in lung cancer patients is sparse. Jones et al[1] identified the lack of studies that investigate the extent to which physical activity can relieve side-effects and symptoms in patients with inoperable lung cancer patients.
The aim of this Study is to investigate the impact of a six-week supervised, structured exercise programme on estimated peak oxygen consumption (VO_{2peak}), strength (1RM (repetition maximum) and quality of life (QOL) in patients with inoperable lung cancer.

Methods
This is a prospective, single-arm intervention study of supervised group training (physical training and relaxation) and individual home-based training (walking and relaxation). Peak oxygen consumption (VO_{2peak}) was assessed using an incremental exercise test. Strength was measured with one repetition maximum test (1RM). QOL were assessed using the Functional Assessment of Cancer Therapy-Lung (FACT-L) scale.
From October 2008 to December 2009, 25 patients with NSCLC III-IV and 4 patients with SCLC ED were recruited. Six patients (20.7%) were lost-to-follow-up. Exercise adherence in the group training was 73%.

Discussion
The current study is one of the first to test whether a supervised group based physical intervention is possible to implement, is beneficial and safe for lung cancer patients with advanced disease while undertaking chemotherapy. The results showed significant improvements in aerobic capacity (VO_{2peak} $p=0.014$), muscle strength (1RM, $p<0.005$), functional capacity (6 MWD, $p=0.006$), and emotional wellbeing (FACT-L, $p=0.025$) after participation in a 6 week combined intervention (supervised and home-based). In contrast, there was no significant improvement in general quality of life (FACT-L total score) or lung function (FEV1).
One Study[2] have shown that lung cancer patients with advanced disease significantly lowered their functional capacity (6 MWD) after two series of chemotherapy ($p=0.01$), and the lung cancer patients with the poorest 6 MWD before starting chemotherapy had a significantly higher disease progression and significantly shorter lifespan compared with patients with a higher 6MWD (i.e. 6.7 months vs. 13.6 months) On the basis of this point, one could speculate that lung cancer patients who either increase their physical capacity or functional capacity could perhaps improve their QOL parameter measures and increase their expected survival. The results of the current Study will contribute new knowledge to research of physical activity among lung cancer patients with advanced disease.

Conclusion
Exercise training is safe and feasible in advanced lung cancer patients undergoing chemotherapy. Exercise training was associated with significant improvements in physiological indices and emotional QOL. Home-based training does not appear viable due to poor adherence.

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A17.)
AUTOPHAGY MAY ENABLE SURVIVAL OF PANCREATIC CANCER STEM CELLS IN OXYGEN- AND NUTRITION DEPLETED TUMOR MICROENVIRONMENTS

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Introduction
Dietary factors influence various cellular processes and thereby overall cancer risk and tumor behavior. Whereas food components including sulforaphane have been shown to stimulate autophagy or "self-eating", it is s unclear whether this catabolic process is a pro- or antitumorigenic response. Autophagy is activated in pancreatic cancer cells and correlates with poor patient outcome. Nutrition and oxygen deprivation activates autophagy, and hypoxia itself is a prognostic factor for poor prognosis. Thus, this alternative metabolic pathway may provide energy for cancer stem cells to enable progression and metastasis activated by tumor hypoxia.

Methods
To examine this hypothesis we used in vitro and in vivo models of pancreatic cancer stem cells and performed electrone microscopy, self-renewal assays, immunhistochemistry of patient tissue, RT-PCR, Western blot analysis, and tumor xenograft studies on mice for analysis.

Results
We found an elevated basal rate of autophagy in pancreatic cancer stem cells compared to more differentiated tumor cells, which could be further enhanced by hypoxia. Autophagy was associated with formation of autophagosomes and autolysosomes and expression of autophagy-related genes. Mechanistically, we detected a correlation between autophagic signaling and apoptosis resistance of pancreatic cancer stem cells. Manipulation of autophagy re-sensitized cancer stem cells to apoptosis and diminished clonogenicity, spheroid formation, ALDH1 and Notch expression, migratory activity and growth on mice.

Discussion
Our studies suggest that disturbance of autophagy switches the cellular balance of dysregulated survival pathways in cancer stem cells to suicide. These results propose an autophagy-manipulating diet involving calorie restriction, ketogenic diet or chemopreventive agents as promising anticancer strategy.

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A18.)
COMMON PATHWAYS IN CANCER AND CARDIAC CACHEXIA

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Introduction
Due to an aging population, cardiovascular and cancer diseases become an increasing problem. The morbidity and mortility of cancer and/or chronic heart failure patients is not only characterized by the progression of the disease-specific process, but also by a multifactorial metabolic syndrom, resulting in a dramatic loss of lean mass and body fat, a process which is described as cachexia. We are interested in the identification of molecular mechanisms in cachexia development because it will allow the therapeutic targeting of common denominators between cardiovascular and cancer diseases. Additionally, we will investigate whether cancer and cardiac cachexia are the result of common or distinct signaling pathways and genetic responses in affected target tissues.

Methods
To induce a cachectic phenotyp in mice, we transplanted mouse colon adenocarcinoma cells subcutaneously in Balb/c mice. Throughout the next 3 weeks, mice were metabolically monitored by mouse MRI technology. To determine the starting point of cachexia we measured the body weight and food intake. Additionally, we monitored the cardiac function by weekly echocardiography and PV-loop measurement to assess the ejection fraction of the left ventricle. Tissue of the experimental animals was collected every week. The heart weight/tibia length ratio, cardiac morphology, cardiomyocyte size and the degree of cardiac fibrosis was determined. Furthermore, the gene expression of the heart was analysed by Taqman analysis and Affymetrix GeneChips.
We isolated cardiomyocytes from newborn rats and co-cultured them with colon adenocarcinoma cells and non-cancer cells, to confirm our *in vivo* data of the heart.

Results
Cancer cachexia was induced by significantly lower body weight, loss of adipose and skeletal muscle masses and anorexia. In a screen for genes of the fetal gene program in the heart we observed that the gene expression was altered over the time, indicating that the tumor bearing mice have a cardiac insufficiency. The echocardiographic assessment and the PV-loop measurement revealed a significantly reduced heart rate as well as fractional shortening in tumor bearing mice. Additionally, the heart weight/tibia length ratio was lower in mice with cancer.

Discussion
In this model we could show that cancer cachexia causes an impairment of cardiac function and energy balance. This leads to cardiac atrophy and cardiac insufficiency. Further experiments will adress the signaling pathways which induce the observed cardiac phenotype.

A19.)
PROGRESSIVE RESISTANCE VERSUS RELAXATION TRAINING FOR BREAST CANCER PATIENTS DURING ADJUVANT CHEMOTHERAPY (BEATE STUDY): DESIGN AND OBJECTIVES.

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Introduction
One of the most distressing symptoms during and after breast cancer treatment is fatigue, a multi-causal, multi-factorial disease. In spite of the high prevalence and impact of cancer-related fatigue, the precise etiology and biological mechanisms are still largely unclear, and effective treatments are scarce. Physical activity appears to have a beneficial effect. However, in previous intervention trials the control group typically obtained „usual care". Thus, it is unclear how far the observed effects are based on the physical exercise, or rather on psycho-social factors, which

likely also have a substantial impact on fatigue, such as increased attention, personal contact with other patients, or being into action against the cancer.
Therefore, we currently perform a randomized controlled intervention study, to investigate the effects and biological mechanisms of a supervised 12-week progressive resistance training on fatigue and quality of life in breast cancer patients during chemotherapy. To determine the effect of the exercise itself beyond potential psychosocial effects, patients in the control group have a comparable training schedule but with relaxation training.

Methods
Breast cancer patients, stage I-III, for whom an adjuvant chemotherapy is scheduled are recruited from clinics or medical centers that offer adjuvant chemotherapies in the area around Heidelberg and Cologne (n=160). Patients are randomly allocated to either progressive resistance training or progressive muscle relaxation training (Jacobsen method). Both training programs are performed 60 min, twice a week for 12 weeks, and are supervised and conducted together with other cancer patients, in Heidelberg at the Institute for Sport and Sport Sciences or the National Center for Tumor Diseases, respectively. At baseline (week 0), after the end of intervention (week 13) and 3 months later (week 26) all endpoints will be assessed: fatigue (fatigue assessment questionnaire, FAQ), quality of life (EORTC-QLQ-C30/BR23), depression (ADS), cognition (trail-making-test), muscle strength and range of motion (IsoMed2000), cardiorespiratory fitness (spiro-ergometry), and body composition (bioimpedance analyses). Further blood, urine, and a diurnal saliva sample are collected. Fatigue, quality of life, and depression assessment and specimen collection will also be in the mid of intervention (week 7). Safety and adherence will be recorded throughout the whole training period.

Results
In Heidelberg, recruitment started May 2010 and will continue until December 2011. To date n=18 patients have been recruited of which four have already successfully completed the intervention. None of the patients abandoned the training program. Main reason for non-participation in the study is long travel distance. In Cologne, start of recruitment is planned for end of 2010.

Discussion
This trial shall contribute to a better understanding of the physiological and psychological effects of exercise interventions and their biological mechanisms in breast cancer patients. The ultimate goal is the implementation of optimized intervention programs to reduce fatigue and improve quality of life after breast cancer.

A20.)
PHYSICAL EXERCISE DURING ADJUVANT CHEMOTHERAPY EFFECTIVENESS STUDY (PACES): A RANDOMIZED CONTROLLED TRIAL TO EVALUATE EFFECTIVENESS AND COST-EFFECTIVENESS OF PHYSICAL EXERCISE IN IMPROVING PHYSICAL FITNESS AND REDUCING FATIGUE

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Introduction
Cancer chemotherapy is frequently associated with a decline in general physical condition, exercise tolerance, and muscle strength, and with an increase in fatigue. While accumulating evidence suggests that physical activity and exercise interventions during chemotherapy treatment may contribute to maintaining cardiorespiratory fitness and strength, the results of studies conducted to date have not been entirely consistent. Additional research is needed to determine the optimal intensity of exercise training programs, in general, and the relative effectiveness of supervised, outpatient (hospital- or physical therapy practice-based) versus home-based programs, in particular.

Methods
This multicenter, prospective, randomized trial will evaluate the effectiveness and cost-effectiveness of a low to moderate intensity, home-based, self-management physical activity program, and a high intensity, structured, supervised exercise program, in maintaining or enhancing physical fitness (cardiorespiratory fitness and muscle strength), in minimizing fatigue, and in enhancing the health-related quality of life (HRQoL) of patients receiving adjuvant chemotherapy for breast or colon cancer (n=360). Patients are being recruited from 12 hospitals in the Netherlands, and randomly allocated to one of the two treatment groups or to a 'usual care' control group. Performance-based and self-reported outcomes are assessed at baseline, at the end of chemotherapy and at six month follow-up.

Results
To date 16 patients have been recruited into the trail. Patient recruitment will continue until January 2012.

Discussion
This large, multicenter, randomized clinical trial will provide additional empirical evidence regarding the effectiveness of physical exercise during adjuvant chemotherapy in enhancing physical fitness, minimizing fatigue, and maintaining or enhancing patients' HRQoL. If demonstrated to be effective, exercise intervention programs will be a welcome addition to the standard program of care offered to patients with cancer receiving chemotherapy.

A21.)
PHYSICAL ACTIVITY DURING CANCER TREATMENT (PACT) STUDY: DESIGN OF A RANDOMISED CLINICAL TRIAL

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Introduction
Thirty percent of cancer survivors report serious fatigue three years after finishing treatment. There is evidence that physical exercise during cancer treatment reduces fatigue. The purpose of our study is to assess the effect of exercise during cancer treatment on reducing complaints of fatigue and on reducing health service utilization and sick leave.

Methods
The PACT-study is a multi-centre randomised study in 150 breast and 150 colon cancer patients undergoing chemotherapy. Participants will be randomised to an exercise or a control group. The exercise group will participate in an 18-week supervised group exercise programme. The control group will be asked to maintain their habitual physical activity pattern. Study endpoints will be assessed after 18 weeks and 9 months. Primary outcome: fatigue (Multidimensional Fatigue Inventory and the Fatigue Quality List) and cost-effectiveness, health service utilization and sick leave. Secondary outcome: health related quality of life (EORTC-QOL-C30, Short Form 36 healthy survey), impact on functioning and autonomy (Impact on functioning and autonomy questionnaire), anxiety and depression (Hospitality Anxiety and Depression Scale), physical fitness (aerobic peak capacity, muscle strength) and body composition. To register health service utilization and sick leave, participants will keep diaries. Physical activity level will be measured using the Short Questionnaire to assess health enhancing physical activity (SQUASH) and will be monitored with an exercise log and a pedometer.
Prior to the PACT-study, we conducted a pilot study to test all procedures. The exercise programme was well tolerated. Recruitment of the PACT-study will be from January 2010 to December 2011.

Discussion
This study investigates the (cost)-effectiveness of exercise during adjuvant treatment of patients with breast or colon cancer. If early physical exercise proves to be (cost) effective, establishing standardised physical exercise programmes during cancer treatment will be planned.

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A22.)
INFLUENCE OF REGULAR PHYSICAL ACTIVITY ON BODY COMPOSITION AND SELECTED PARAMETERS OF LIPID METABOLISM IN BREAST CANCER PATIENTS RECEIVING CHEMOTHERAPY - A PILOT STUDY

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Introduction
Visceral adipose tissue expresses a variety of adipocytokines associated with the occurrence of breast cancer.[1] Leptin correlates positively with body fat mass and increases the proliferation of tumor cells.[2] Adiponectin seems to have an inhibiting effect on tumor growth. However, the adiponectin concentration decreases with increasing body fat.[1,3] The relationship between high insulin levels and the pathogenesis of breast cancer is meanwhile proved sufficiently.[4]
There is evidence that physical activity has positive effects on quality of life, the fatigue syndrome, exercise capacity or strength after and even during therapy.[5] So far there is little data on the impact on adipocytokines in this context, but it appears that physical activity has a positive influence only in connection with weight reduction or improvement in body composition.[6]

Methods
In this pilot study 12 women with a primary tumor of the breast participated in a twelve week exercise program 3 times a week for 60-90 min. All of them were at the beginning of adjuvant chemotherapy. The program consisted mostly of strength training, endurance training and forms of relaxation. The following parameters have been examined at baseline (T1) and after (T2) the 12-week exercise program: body weight and composition, exercise capacity, quality of life, adipocytokine (leptin, adiponectin) and insulin levels.

Results
Baseline and week-12 measurements were available for 10 patients. The body weight changed from T1: 68,6kg to T2: 71,6kg (p=0,004) but the group experienced no significant changes in body fat (T1: 30,9% T2: 30,7%; p=0,763). There were no significant changes in levels of leptin (T1: 20,6ng/ml; T2: 18,9ng/ml; p=0,613), adiponectin (T1: 13,7µg/ml; T2: 13,7µg/ml; p=0,987) and insulin (T1: 17,8µU/ml T2: 13,9µU/ml; p=0,365). There have been no statistical significant changes in exercise capacity. At baseline they reached the approximate anaerobic threshold of 4 mmol/l at 103,0W performance and after the program at 93,4W performance (p=0,172) Most aspects of quality of life did not show any significance. Only the item "future perspectives" had a positive significant trend (p=0,037).

Discussion
At first appearance breast cancer patients, who participated in the exercise program did not experience a great benefit. It should be noted, however, that patients were receiving chemotherapy in the time of the program, which usually goes along with a decrease in exercise capacity and quality of life. This study showed that even while receiving chemotherapy it is possible to preserve quality of life and exercise capacity levels through exercising as well as stabilize body composition. Therefore in a next step the present results will be compared with the data of a control group which is planned to start in December.

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A23.)
PRIMARY AND SECONDARY CANCER PREVENTION BY PHYSICAL ACTIVITY

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Introduction:
Primary and secondary cancer prevention has substantial impact on the individuals´ health but also on socioeconomic aspects.

Methods
Therefore, the literature was reviewed for studies indicating how the goal of cancer prevention can be achieved.

Results
For primary cancer prevention, a convincing risk reduction by physical activity was found for colon cancer (40 – 50 %) and estrogen dependent malignancies such as breast (40 – 50 %) and endometrium cancer (35 – 49%). Risk reduction is likely for some others, e. g. ovar, lung or prostate, respectively, but no definite conclusions can be drawn for hematological malignancies. For secondary cancer prevention, a convincing risk reduction by physical activity was found for colon and breast cancer. Plausible explanations for reduction of the individual´s cancer risk by increased physical activity are currently available for estrogen dependent cancers (breast, ovarian, endometrium) and colon cancers.

Discussion
Due to an obvious lack of prospective randomised trials for primary cancer prevention, any evidence for a correlation between physical activity and cancer prevention is currently based on cohort and case control studies. Furthermore, the study results are sometimes inconsistent, and only for selected cancers such as cancers of colon, breast, and endometrium, the available data are sufficient to draw any conclusions, resulting in a level of evidence 2 to 3 (level of recommendation "B"). For secondary cancer prevention, several randomised trials show a substantial risk reduction by physical activity in the case of breast and colon cancer.
Thus, it is highly probable that behavioural changes towards a healthy life style including increased physical activity are appropriated to achieve the goal of cancer prevention.

A24.)
EFFECTS OF A PARTLY SELF-ADMINISTERED ENDURANCE AND RESISTANCE TRAINING IN PATIENTS UNDERGOING ALLOGENEIC STEM CELL TRANSPLANTATION

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Introduction
Before, during and after allogeneic hematopoietic stem cell transplantation (allo-HSCT) patients experience considerable physical, psychological and psychosocial distress. Besides GvHD and infections, particularly reduced physical performance and functioning as well as high levels of fatigue affect patient's quality of life negatively. Referring to this, physical exercise constitutes a potentially promising intervention to moderate such side effects [1].

Methods
This multicenter randomized-controlled trial examined the effects of a partly self-administered exercise intervention before, during, and after allo-HSCT on these side effects. After randomization to an exercise (EX) and a social contact control group (Control) 105 patients trained in a home-based setting prior to hospital admission, during inpatient treatment and a 6-8 weeks period after discharge. Fatigue, physical performance, quality of life and physical/psychological distress were measured by standardized instruments at baseline, admission to, and discharge from hospital and 6-8 weeks after discharge.

Results
The EX (in comparison with Control) showed significantly better results for endurance performance at the end of study (p= .024) and over study time (p= .006). A better course of muscle strength could be reported during inpatient setting (p= 0.42). Concerning fatigue, patients of the intervention group showed significantly superior values for all measurements after HSCT and for course over time of study participation (p= .004 to .026). Also physical functioning was significantly better in the EX at the end of treatment (p= .033). At least the reduction of global distress take better courses over study time for the training group (p= .013). Referring to perceived distress, the intervention seems to be effective for physical and emotional problems. Physical fitness correlates highly significantly (r= .361 to .618) with all reported symptoms/variables.

Discussion
Physical exercise is beneficial for patients under allo-HSCT, even if the intervention is only partly supervised. Because of low personnel requirements it might be valuable to integrate such a program into standard medical care. For the first time it could be shown that physical exercise can alter fatigue in the context of allo-HSCT.
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A25.)
PHYSICAL ACTIVITY IN PEDIATRIC CANCER PATIENTS UNDERGOING TREATMENT

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Introduction
Limited physical activity is a well recognized problem in pediatric cancer patients during the cause of treatment. However, the actual extent of inactivity has rarely been quantified. In the present study patients' physical activity was objectively assessed.

Methods
The study included 80 patients with different tumor entities (29 bone tumor patients, 20 leukemia patients, 15 lymphoma patients, 12 brain tumor patients, 3 germcell tumor patients, 1 neuroblastoma patient) and

45 healthy children matched for age and gender. Physical activity was measured with a uniaxial accelerometer providing information about steps per day and steps per minute, respectively. Different interventions were implemented according to the patients' present well-being and interests.

Results

Patients only reached 23% of the control group's steps per day during inpatient stays and 40% during home stays ($p < 0.001$). During inpatient stays, patients reached 58% of the home activity (significantly different, $p< 0.001$). Patients with bone tumors were distinctly less active than patients with other tumor entities in both setting. However, the differences between diagnostic groups were not significant.

Discussion

The present study revealed that both the amount and the intensity of physical activity were considerably reduced in pediatric patients undergoing cancer treatment. The influence of individual disease- or treatment-specific factors on physical activity could not be determined due to the complexity of cancer treatment and the small sub-groups. However, some differences between cancer entities could be revealed. Patients with a bone tumor presented more inactivity than the other cancer entities. These patients have to undergo surgery for local disease control, are often advised to offload the extremity beforehand and only gradually return to walking after surgery. Due to the severe and sometimes persistent restriction modified activity recommendations, especially individually-tailored intensity categories should be considered for those patients.

The present results were in accordance with the patients' own experiences and their care givers. In the present study this well recognized problem was objectively quantified to provide baseline information for planning and evaluating future projects.

Furthermore, considering the impact of inactivity on a child's development [1], the results emphasized the need for interventions to promote physical activity in these patients already during the acute stages of treatment. These interventions must be individually tailored to the patients' state of well-being, interests and needs [2].

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A26.)
PHYSICAL EXERCISE THERAPY AND RELAXATION IN ALLOGENEIC STEM CELL TRANSPLANTATION (PETRA-STUDY). A STUDY DESIGN.

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Introduction

Allogeneic hematopoietic stem cell transplantation (allo-HSCT) is a radical treatment for malignant hematopoietic diseases. Beside the potential curative perspective, allo-HSCT is a medical option with high treatment and disease related mortality and side effects. Before, during and after transplantation, patients experience considerable physical, psychological and psychosocial distress. Besides GvHD and infections, particularly reduced physical performance and functioning as well as high levels of fatigue affect patient's quality of life negatively. These debilitating effects may limit reintegration into usual life after allo-HSCT. Referring to this, physical exercise constitutes a potentially promising intervention to moderate such side effects[1]. The PETRA-Study is designed to examine the effects of an one-year follow-up physical exercise intervention on side-effects, complications and prognosis during and after allo-HSCT.

Methods

Using a single-center, randomized controlled design, 220 patients will be enrolled in this study. After baseline assessment eligible participants will be randomized to the exercise intervention group (EG) or control group (CG). To ensure randomized groups are similar at baseline, the randomization will be stratified based on age, gender, diagnosis, donor-recipient characteristics and conditions regimes. Written informed consent will be obtained from all participants prior to initation of study procedure.

The exercise intervention will include both, resistance and endurance training. The exercise training protocol is divided into three parts: exercise for the inpatient setting, exercise for the outpatient setting until day 100 post transplantation, and exercise for the outpatient setting day 100 until day 365 post transplantation. The exercise program will be different in all conditions (e.g. duration, intensity).

Patients assigned to the CG will perform a relaxation program based on progressive muscle relaxation. In terms of social contact both groups will be equal.

Study endpoints will be fatigue, quality of living, endurance performance and muscle strength, hematological and immunological reconstitution, duration and severity of infections and GvHD, survival, distress, depression, perceived locus of control, perceived self-efficacy, social status after allo-HSCT, and changes in physical activity behavior post transplantation. Assessment points will be at admission to the hospital, at discharge, day 100, day 180, day 270, day 365 (endpoint of the intervention), and day 730 post transplantation.

Discussion

Overall, the current literature indicates that exercise interventions during and post allo-HSCT are feasible, well-tolerated and associated with significant positive benefits. However, most of the previous studies have methodical problems and hamper the interpretation. To date, there are no studies in allo-HSCT survivors that include a long-term follow up intervention.

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A27.)
IMPLEMENTATION AND SCIENTIFIC EVALUATION OF REHABILITATIVE SPORTS GROUPS FOR PROSTATE CANCER PATIENTS IN NRW- A PILOT PROJECT

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Introduction
Over 60 000 new cases of prostate cancer (PCa) are reported annually in Germany.[1] Despite the high rate there is a lack of supportive measures for male patients. Over 800 rehabilitative sports groups for cancer patients provide a good care structure in Germany, however at least 90% of the participants are breast cancer patients.[2,3] Furthermore only few studies have evaluated physical activities in the after-care of PCa.[2] Therefore the Krebsgesellschaft NRW, the Deutsche Sporthochschule Köln, and the LandesSportBund NRW set themselves the goal to establish rehabilitative sports groups in NRW particularly for PCa patients and to then evaluate the effects of the offered exercise program. The main outcomes of the study include aerobic endurance performance, quality of life, incontinence, as well as erectile dysfunction.

Subjects and Methods
In cooperation with five acute clinics in NRW (Universitätsklinik Aachen, Universitätsklinik Essen, Heilig-Geist-Krankenhaus Köln-Longerich, Klinikum Leverkusen and Marien-Krankenhaus Bergisch Gladbach) a total of 97 PCa patients following prostatectomy were recruited into this randomized controlled and patient-preference trial. Within a 15-month intervention patients exercise in a rehabilitative sports group once a week for 60 minutes according to the guidelines of the legislator (§44 SGB IX). Additionally a second exercise session per week is recommended. Patients in the control group do not participate in the intervention.

Results
In October 2007 the study started off with 4 rehabilitative sports groups for PCa patients. During the course of preparation and the following recruitment phase further groups were established, so that there were 15 groups by December 2008 and 42 by April 2009. According to the LandesSportBund NRW at least 60 rehabilitative sports groups for PCa patients exist in NRW today. Evaluation of the effects of the exercise program will follow in 2011, as soon as the study is completed.

Discussion
By combining science, practice and public relations an important contribution to the care structure for PCa patients could be made. The great increase of rehabilitative sports groups for PCa patients in NRW indicates the demand for such measures. Further efforts are necessary to improve the care structure for PCa patients nationwide.

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Speaker Biographies

Winfried Banzer

Universität Frankfurt – Sportmedizin

Prof. Winfried Banzer is Dean of the School of Psychology and Sport Sciences, and Head of the Department of Sports Medicine – Prevention and Rehabilitation at Goethe University, Frankfurt. His major research interests include preventive and rehabilitative sports medicine, health enhancing physical activity, healthy aging etc.

Professor Banzer is Member of the EU Expert Group Physical Activity Guidelines, of the Platform on Diet, Physical Activity and Health of the European Union, representing European Non-governmental Sports Organisation (ENGSO), Member of the Steering Committee of the European network for the promotion of health-enhancing physical activity (HEPA/WHO) and Member of the Advisory Board for the Development of Sport of the German Olympic Sports Confederation (DOSB).

Peter Bärtsch

Director of Division Internal Medicine VII:
Sports Medicine at Heidelberg University Hospital

Professor of Sports Medicine

Peter Bärtsch is head of the Division VII: Sports Medicine of the Department of Internal Medicine at Heidelberg University Hospital and holds the Chair of Sports Medicine. He is currently the Chairman of the Interdisciplinary Center for Sports and Exercise Medicine (Interdisziplinäres Zentrum für Sport- und Bewegungsmedizin, IZSB). Dr. Bärtsch has authored more than 200 peer reviewed publications and serves on multiple international committees and editorial boards. He is best known for his studies on the pathophysiology and prevention of high altitude related diseases, such as high altitude pulmonary edema. Additional research includes studies on the effects of exercise on hemostasis and on training in hypoxia and at high altitude.

Hans Helge Bartsch

Medical Director and chairman of the Executive Board of the Tumor Biology Center at the Albert-Ludwigs University Freiburg, Germany. Head of the Dept. of Oncologic Rehabilitation and Professor at the Medical faculty University Freiburg.

After 15 years of basic research and clinical studies in the field of immunotherapy of malignant diseases H.H.Bartsch focussed his scientific work to somatic and psychosocial problems of treatment related disorders in cancer patients. As head of a 120 inpatient oncologic rehabilitation unit he did numerous studies in different patient cohorts i.e. with breast cancer, colon cancer as well as in patients after hematologic stem cell transplantation. He is investigating factors predicting fatigue after cancer treatment, influencing quality of life or response to different training strategies against cognitive deficits after chemotherapy. As chairman of the working group for supportive care, rehabilitation and social medicine in the German Cancer Society he is engaged in the development of sop's for supportive and rehabilitative care in cancer patients. Moreover his particular concern concentrates on a better implementation of supportive and rehabilitative strategies into primary care of cancer patients.

Freerk T. Baumann

German Sport University

Dr. Freerk T. Baumann, born in 1975, studied sport science at the German Sport University in Cologne from 1996 to 2001 with a major in sport medicine and rehabilitation. From 2002 to 2004 he worked as a therapist in the Clinic for Bone Marrow Transplantation in Idar-Oberstein. During this time he became acquainted with the interests, desires, and needs of cancer patients. In August 2005 Dr. Baumann finished his doctor thesis and then worked as a scientific assistant and lecturer for the Institute for Rehabilitation and Sport for the Disabled at the German Sport University in Cologne from 2005 to March 2009. In April 2009 he changed institutes and started working as a scientific assistant and lecturer for the physician Professor Dr. Wilhelm Bloch in the Institute for Sport medicine, Department for Molecular and Cellular Sport medicine at the German Sport University in Cologne. His main point of research is „physical activities and cancer". He was awarded with the Toyota Award 2005 (science award of the German Sport University Cologne), the Helmut Wölte Award for Psychooncology 2009 as well as different congress prizes.

Nathan A. Berger

Hanna-Payne Professor of Experimental Medicine
Professor Medicine, Biochemistry and Oncology
Director, Center for Science, Health and Society
Director, Trandisciplinary Research Energy Balance and Cancer
Director, Aging-Cancer Research Program
Case Comprehensive Cancer Center
Case Western Reserve University

Cleveland, Ohio USA

Nathan A. Berger, MD is the Hanna-Payne Professor of Experimental Medicine and Director of the Center for Science, Health and Society at Case Western Reserve University School of Medicine where he is also Professor of Medicine, Biochemistry and Oncology. Dr. Berger received his MD from Hahnemann Medical College in 1966, and subsequently served his internship in Medicine at Michael Reese Medical Center in Chicago, and his residency at Barnes Hospital, Washington University in St. Louis. He served as a Lieutenant Commander in the United States Public Health Service and was a Research Associate at the NIH, NICHD Ger-

ontology Research Center, Laboratory of Molecular Biology. He completed a fellowship in Hematology and Oncology at Washington University School of Medicine and joined the faculty there before moving to Case Western Reserve University School of Medicine as Professor of Medicine and Biochemistry and Director of the Hematology/Oncology Division, and later served as Dean of the School of Medicine and Vice President for Medical Affairs. He was the founding Director of the award winning NCI Cancer Center, Case Western Reserve University/Ireland Cancer Center, which was later designated an NCI Comprehensive Cancer Center. Dr. Berger is an active researcher whose focus includes laboratory and translational aspects of poly (ADP-ribose) polymerase, DNA damage and repair, stress proteins, developmental therapeutics, aging and cancer, energy balance and cancer and unexplained anemia of the elderly with over 160 papers, reviews and book chapters published on these subjects.

Laurien M. Buffart

PhD, Post-doctoral researcher, EMGO Institute for Health and Care Research, VU University Medical Center, Amsterdam, The Netherlands

Laurien Buffart is a post-doctoral Researcher at the EMGO Institute for Health and Care Research (EMGO+), VU University Medical Center Amsterdam. She holds a Master's degree in Human Movement Sciences and Epidemiology. She obtained her PhD degree in November 2008 at the Department of Rehabilitation Medicine of Erasmus Medical Center Rotterdam.

Currently, she is involved in the coordination of the Alpe d'HuZes Cancer Rehabilitation (A-CaRe) Program. A-CaRe encompasses four randomized controlled trials evaluating the effectiveness and cost-effectiveness of physical activity and exercise programs on physical fitness, fatigue and quality of life in various groups of cancer patients: (i) after chemotherapy; (ii) during chemotherapy; (iii) after stem cell transplantation; (iv) in childhood cancer. She obtained a 2-year fellowship granted by the EMGO+ Institute to explore the mediators and moderators of exercise interventions effects on cancer related fatigue and quality of life in cancer patients and survivors.

Jenny Chang-Claude

Head, Unit of Genetic Epidemiology in Division of Cancer Epidemiology, German Cancer Research Center (DKFZ)

Professor, University of Heidelberg

Jenny Chang-Claude is Head of the Unit of Genetic Epidemiology in the Division of Cancer Epidemiology at the German Cancer Research Center (DKFZ) in Heidelberg. She holds a Master's degree in (Genetic) Epidemiology and PhD in Epidemiology. She joined the Department of Cancer Epidemiology at the DFKZ as a research scientist and heads the Unit of Genetic Epidemiology since 1994 and is also Professor of Epidemiology at the University of Heidelberg since 2004. Dr. Chang-Claude has authored more than 260 publications and serves on several international committees and editorial boards.

Dr. Chang-Claude is best known for her studies on the (genetic) epidemiology of breast cancer, with focus on the independent, joint and interaction effects of genetic and lifestyle/environmental factors, particularly preventable factors, and is actively involved in several large consortia aimed at elucidating the genetic and epidemiologic architecture of specific cancers. Additional research includes radiogenetics and prognostic studies.

Robert T. Croyle

Fellow, Society of Behavioral Medicine; Member, Academy of Behavioral Medicine Research; Fellow, APA Division 38 (Health); APA Meritorious Research Service Citation; APA Nathan Perry Award; NIH Director's Award; University of Utah College of Social and Behavioral Sciences Superior Research Award

Robert (Bob) T. Croyle, PhD, was appointed director of the NCI Division of Cancer Control and Population Sciences in July of 2003. In that role, he oversees nearly a half billion dollars in NCI-funded research in epidemiology, surveillance, behavioral and health services research. He previously served as the division's associate director for behavioral research, leading the program's development and expansion. Before coming to NCI in 1998, he was professor of psychology and a member of the Huntsman Cancer Institute at the University of Utah in Salt Lake City. Prior to that, he was a visiting investigator at the Fred Hutchinson Cancer Research Center in Seattle and assistant professor of psychology at Williams College in Massachusetts. Dr. Croyle received his PhD in social psychology from Princeton University in 1985, and graduated Phi Beta Kappa with a BA in psychology from the University of Washington in 1978.

Fernando Dimeo

Charitè Campus Benjamin Franklin

Fernando Dimeo, MD, PhD, has been working in the area of exercise programmes for cancer patients for almost 20 years. He leads the Section Sports Medicine at the Charité University Hospital in Berlin, Germany.

His main areas of research are the development and application of exercise programmes for cancer patients undergoing intensive treatments (i.e. peripheral stem cell transplantation) and the use of exercise in patients with hematological malignancies.

Gerhard Huber

Institute of Sport and Sports Science

University of Heidelberg

- Teaches at the *Institut für Sport und Sportwissenschaft der Universität Heidelberg*
- Managing Committee of the *Deutschen Verbands für Gesundheitssport und Sporttherapie*
- Visiting Professor at the University Leuven (Belgium, European Master Degree of Adapted Physical Activity)
- Visting Professor at the University Salzburg (Austria)
- Executive Editor of the Journal *Bewegungstherapie und Gesundheitssport* (Thieme Verlag Stuttgart)
- Member of the Scientific board of the *German Network for Health Promoting Hospitals (WHO – CC)*
- Member of the Board of *Plattform Ernährung und Bewegung"*
- Member of the Commitee *Bewegungstherapie* of the DGRW
- Lead Auditor in Quality Management in the Health Care System (DIN ISO 9000, TÜV®)

Research focus: Worksite health promotion, Cancer and Exercise, Obesity and physical activity, Evaluation research

Melinda L. Irwin

Associate Professor of Epidemiology and Public Health
Yale School of Medicine
Director
Cancer Prevention and Control Research Program
Yale Cancer Center

Melinda L. Irwin, PhD, MPH is an associate professor at the Yale School of Medicine and director of the Cancer Prevention and Control Research Program at Yale Cancer Center. Dr. Irwin's primary research interest is in the area of physical activity, weight and cancer prevention and control. She is currently the principal investigator of two NCI-funded exercise trials in women with breast and ovarian cancer. In addition, Dr. Irwin is involved various national projects and initiatives including the Health, Eating, Activity and Lifestyle (HEAL) Study, and the multi-site NCI-funded Transdisciplinary Research on Energetics and Cancer (TREC) Initiative. Dr. Irwin directs the TREC Education, Training and Outreach Core, and the TREC Cancer Survival Task Force. She has published extensively on related topics in medical journals and book chapters. Dr. Irwin has also served on various research review committees for the National Cancer Institute, Lance Armstrong Foundation, and the American Cancer Society, as well as on advisory committees to develop consensus statements on physical activity, diet, weight and cancer survivorship.

Patrick Jahn

Head Nursing Research and Development, University Hospital Halle
Research Assisted, MSc Nursing and Phd candidate, Medical Faculty, Institute for Health and Nursing Science

Patrick Jahn is a nurse with background in acute rehabilitation and holds a master's degree in health and nursing science since 2006. Since 2007 he works as a research assistant in work group of Prof. Dr. Margarete Landenberger at the Institute for Health and Nursing Science. His work is focused on nurse led interventions for symptom management, self management and patient education in acute cancer care settings.

Dirk Jäger

Director Department of Medical Oncology, National Center for Tumor Diseases (NCT) Heidelberg.

Dirk Jäger is head of the division of Medical Oncology at the University Medical School Heidelberg and joint Director of the National Center for Tumor Diseases in Heidelberg. Dr. Jäger coordinates the clinical research activities in oncology at NCT and University Medical School Heidelberg. His scientific interest is the characterization of tumor host immune interactions on the level of cellular immune responses, humoral immune responses and local and systemic cytokines profiles. One aspect of his studies is the influenze of physical exercise on such tumor host immune interactions.

Elke Jäger

Director at Department of Oncology and Hematology, Krankenhaus Nordwest, Frankfurt

Professor for Interdisciplinary Oncology at Goethe University, Frankfurt
Adjunct Professor at Roswell Park Cancer Institute, Buffalo, USA
Head of the Clinical Trial Center at Krankenhaus Nordwest, Ludwig Institute for Cancer Research

Elke Jäger is the Director of the department of Oncology and Hematology at Krankenhaus Nordwest in Frankfurt. She is an Oncologist specialized in tumor-immunology. Elke Jäger is the head of the local clinical trial center and a molecular research lab sponsored by the Ludwig Institute for Cancer Research. Since 2007, she is Professor for Interdisciplinary Oncology at Goethe University, Frankfurt and holds a close collaboration with the Georg Speyer Haus for fundamental research projects. In 2010, Elke Jäger was announced as Adjunct Professor at Roswell Park Cancer Institute, Buffalo, according to her close international collaboration on the field of specific cancer immunotherapy. Elke Jäger established the sports program for cancer patients in Frankfurt and the surrounding area in 2005. She is the main initiator for nation wide benefit rowing competitions sponsoring the sports project and motivating patients and

physicians for sports simultaneously. Clinical trials studying possible correlations between tumor-immunological effects and other impacts of endurance training in oncology patients are under her conduction.

Rudolf Kaaks

Division of Cancer Epidemiology
German Cancer Research Center (DKFZ)

Rudolf Kaaks is Professor of Cancer Epidemiology and head of the Division of Cancer Epidemiology at the German Cancer research Center (DKFZ). Since many years, he has been working on the European "EPIC" project. His research focus within EPIC is metabolic and endocrine pathways that may provide a link between lifestyle, nutritional energy balance and cancer risk. Besides his activities in EPIC, Rudolf Kaaks is one of the two scientific coordinators for the development of a large prospective cohort study in Germany – a major national resource for future epidemiologic studies on the causes of chronic diseases.

Mario Kratz

Assistant Member, Fred Hutchinson Cancer Research Center, Division of Public Health Sciences, Cancer Prevention Program, Seattle, WA
Research Assistant Professor, University of Washington, Department of Epidemiology, Seattle, WA
Adjunct Research Assistant Professor of Medicine, University of Washington, Department of Medicine, Division of Metabolism, Endocrinology, and Nutrition, Seattle, WA

Mario Kratz holds M.Sc. and Ph.D. degrees in Nutritional Sciences from the University of Bonn. He is currently an Assistant Member in the Cancer Prevention Program at Fred Hutchinson Cancer Research Center, and a Research Assistant Professor at the University of Washington in Seattle, WA. His primary research interests are obesity and associated diseases. Specifically, his group studies the metabolic and molecular mechanisms by which excess body fat mass is linked to type 2 diabetes, cardiovascular disease, and certain types of cancer. A specific area of interest in this regard is chronic low-grade inflammation of adipose tissue. Several ongoing projects aim to characterize the role of immune cells present in human adipose tissue in the etiology of obesity-associated disease. Another area of interest is the study of lifestyle and particularly dietary factors that affect chronic, low-grade inflammatory conditions.

Michael Leitzmann

Chair and Full Professor, Department of Epidemiology and Preventive Medicine, University of Regensburg, Germany

Michael Leitzmann is Head of the Department of Epidemiology and Preventive Medicine at the University of Regensburg, Germany. He holds an MD from the University of Berlin and an MPH in Quantitative Methods and a doctorate in Epidemiology from the Harvard School of Public Health. Dr. Leitzmann has authored or co-authored more than 180 peer-reviewed research articles and serves on numerous journal editorial boards and international scientific committees. His main research interests include the interrelationships between diet, body size, physical activity, and the development and prognosis of chronic disease, particularly cancer.

Alejandro Lucia

Professor in Exercise Physiology,
Department of Biomedicine
Universidad Europea de Madrid, Spain

Alejandro Lucia is a Professor in Exercise Physiology at the Universidad Europea de Madrid since 2004. His main focus of interest in the last years is exercise prescription for different population groups, i.e. cancer survivors of all ages, elderly people, children with anorexia and cystic fibrosis, McArdle's (glycogenosis type V) patients, and pregnant women. For instance, he is one of the authors of the last position stand paper by the American College of Sports Medicine on exercise recommendations for cancer survivors worldwide. He is also interested in understanding the mechanisms that explain the health benefits of exercise, i.e. by working with animal (murine models) lately, and by determining those genetic variants that are associated with exercise-related phenotypes and athletic status. He has authored ~200 peer-reviewed papers (in JCR journals), serves on several journal editorial boards and is a section editor (Physiology) in the journal PloS One.

Jeffrey A. Meyerhardt

Associate Physician
Assistant Professor of Medicine
Dana-Farber Cancer Institute Boston, Massachusetts

Jeffrey Meyerhardt earned his medical degree from Yale University School of Medicine in New Haven, Connecticut and completed an internship and residency in medicine at Beth Israel Deaconess Medical Center in Boston, MA. He then went on to serve a clinical fellowship in medicine, hematology/oncology at Dana Farber Cancer Institute, a clinical and research fellowship in hematology/oncology at Massachusetts General Hospital, and a clinical fellowship in medicine, hematology/oncology at Brigham and Women's Hospital. Dr Meyerhardt also holds a Masters of Public Health from Harvard School of Public Health in Boston.
Dr. Meyerhardt's research interests are focused on the influence of diet and lifestyle on outcomes among patients with cancer, particularly colorectal cancer. He is a project leader for a project in Harvard's recently award TREC grant. In addition, he is involved in studies on the role of PI3-kinase signaling pathway in defining sensitivity and resistance to anti-EGFR therapy in colorectal cancer through the Dana-Farber / Harvard Cancer Center GI SPORE. Finally, he has

led multiple phase II trials for gastrointestinal cancers and is the principal investigator for an ongoing NCI-sponsored phase III adjuvant therapy for stage III colon cancer. He has presented nationally and internationally and published extensively on related topics in peer-reviewed journals and book chapters. Dr. Meyerhardt is member of the Editorial Board for Journal of Clinical Oncology and served as a Guest Editor for a special issue on Hosts Factors and Cancer Prognosis. Dr. Meyerhardt is also ad hoc reviewer for numerous clinical journals, including Journal of the National Cancer Institute, Annals of Oncology, and Lancet.
Certified by the American Board of Internal Medicine and the Subspecialty Board of Medical Oncology, Dr. Meyerhardt is a member of the American Society of Clinical Oncology, serving on multiple committes including the Clinical Practice Guidelines Committee, Annual Meeting Scientific Program Committee and Cancer Education Committee. He is active in the Cancer and Leukemia Group B cooperative group as a cadre member for the prevention committee and gastrointestinal cancer committee.

Linda Nebeling

Branch Chief
Health Promotion Research Branch
Behavioral Research Program

Linda Nebeling, PhD, MPH, RD, FADA is the Chief of the Health Promotion Research Branch, in the Behavioral Research Program (BRP), in the Division of Cancer Control and Population Sciences (DCCPS). Dr. Nebeling is the lead Program Director for the Transdisciplinary Research in Energetics and Cancer (TREC) Centers initiative, funded by the National Cancer Institute (NCI). She has served as the Acting Associate Director of the BRP, DCCPS also. Prior to joining the DCCPS, she was a Public Health Nutritionist and worked in the NCI's National 5 A Day for Better Health Program, the largest public-private nutrition education program of its kind. She was awarded a post-doctoral appointment in the NCI Cancer Prevention Research Branch, in the NCI Cancer Prevention Fellowship Program. Dr. Nebeling has worked previously as a Teaching Assistant in the Department of Nutrition, Case Western Reserve University and a Clinical Dietitian at Memorial Sloan-Kettering Cancer Center.

Dr. Nebeling received her PhD in Nutrition from Case Western Reserve University. She has an MPH from Johns Hopkins University, Bloomberg School of Public Health. She is a graduate of the Dietetic Internship Program at Memorial Sloan Kettering Cancer Center, New York. Her research has focused on the relationship between dietary behaviors in different population groups, especially for fruit and vegetable consumption, and the risk of cancer and other chronic diseases. She has authored numerous peer-reviewed publications and is a reviewer for many professional journals.

Dr. Nebeling is a member of the National Fruit and Vegetable Alliance, as part of the PBH-CDC „Fruits and Veggies – More Matters" Program. She has served as a member of the Research Advisory Board of the Produce for Better Health Foundation; on the executive board of the Oncology Nutrition Dietetic Practice Group in the American Dietetic Association; and on the Editorial Board of the Journal of the American Dietetic Association. She has received 3 NIH Merit Awards for exemplary contributions in the field of nutrition and health promotion. In 2001, she was awarded the status of Fellow by the American Dietetic Association (FADA).

Morten Quist

Research Physiotherapist. Stud. Scient. san.

Trained physical therapist from Copenhagen School of Physiotherapy in 1997 Initiator of the Project 'Brothers in arms', a combined training, exercise an educational intervention for male cancer patients.
He was in 2001 employed in Body & Cancer Project at University Hospital Copenhagen, where he designed the physical part of the intervention and were responsible for the instruction, supervision and testing of patients enrolled. Research focused on the effect of combined strength and fitness in particular aerobic power and body composition.
Currently just ended a pilot study examining the effects of physical activity for inoperable lung cancer patients. These effects will be tested in a randomized trial. Initiator of the realization of Proof of Life (www.proofoflife.dk). a sports society for young cancer survivors and PACT (physical activity after cancer treatment) (www.pactforening.com) a sports society for former cancer survivors
Active Triathlete

Falk Müller-Riemenschneider

Head Project Division Cardiovascular Research,
Teaching Coordinator
Institute for Social Medicine, Epidemiology
and Health Economics
Charité University Medical Centre Berlin, Germany

Dr. Falk Müller-Riemenschneider is head of the division of cardiovascular research and teaching coordinator at the Institute for Social Medicine, Epidemiology and Health Economics, Charité University Medical Centre Berlin. He has graduated from the University of Cologne before working as a Physician in General Medicine and Cardiology at the Royal London Hospital and the Oxford University Hospitals. Dr. Falk Müller-Riemenschneider holds a Masters degree in Public Health from the London School of Hygiene and Tropical Medicine and a doctorate degree from the department of Cardiothoracic Surgery of the University of Cologne.
In his present position he is responsible for various epidemiological and public health research projects with a focus on the prevention of chronic diseases. These involve randomized-controlled trials, registry studies, cross-sectional studies, as well as systematic reviews, meta-analyses, and health technology assessments. Modifiable risk factors,

and among them especially the promotion of exercise and physical activity represent one of his major research interests.

Connie J. Rogers

Pennsylvania State University

Connie Rogers is an Assistant Professor in the Department of Nutritional Sciences at Penn State University, and is the recipient of the Broadhurst Career Development Professorship in the College of Health and Human Development. Her Ph.D. training is in Cell Biology & Physiology from the University of Pittsburgh where she was trained as a tumor immunologist. She did a postdoctoral fellowship in the Department of Molecular Virology, Immunology & Medical Genetics, at Ohio State University, College of Medicine & Public Health.

She did an additional fellowship in the Cancer Prevention Fellowship Program at the National Cancer Institute, during which time she obtained a Master of Public Health Degree, focusing in Epidemiology, from the University of Pittsburgh. Following her fellowship in the Cancer Prevention Program, she worked as a Senior Research Fellow in the Laboratory of Tumor Immunology & Biology at NCI during which time she had the opportunity to participate in both bench and population-based research examining the role of changes in energy balance on immune function.

Her laboratory examines the role of physical activity and obesity on inflammatory mediators, anti-tumor immune mechanisms, and the downstream consequences of energy balanced-induced changes in immune processes on gastrointestinal and breast cancer incidence, development and metastasis.

Karen Steindorf

Senior Scientist and Deputy Head of the Unit of Environmental Epidemiology, German Cancer Research Center (DKFZ), Heidelberg

Since 1999, Karen Steindorf established a working group on "Physical Activity and Cancer" at the German Cancer Research Center in Heidelberg, Germany. She holds a Diploma/Master's degree in Statistics from Dortmund University. As PhD student she worked in the Division of Epidemiology at the German Cancer Research as well as in the Division of Biostatistics at the National Cancer Institute, Bethesda, USA (DAAD fellowship). Since 2007 she is an associated Member of the Medical Faculty of the University Heidelberg for Epidemiology and Biostatistics.

Dr. Steindorf has authored more than 60 journal publications and book chapters/monographs. For several years she served as Board Member of the German Epidemiologic Society. Dr. Steindorf is known for her epidemiologic contributions to the primary preventive effects of physical activity on various cancer sites, both from case-control and cohort studies, her investigations into the biological mechanisms of physical activity, as well as her expertise on quantitative risk assessments. In the field of physical activity for cancer patients, Dr. Steindorf is currently Principal Investigator of two randomized controlled trials (BEATE study, BEST study), both being conducted in cooperation with the NCT in Heidelberg. For the planned German National Cohort, she is Co-Chair of the Working Group Physical Activity and member of further working groups.

Michael Thomas

Head, Thoracic Oncology, Thoraxklinik Heidelberg / NCT-Heidelberg

Full Professor, Thoracic Oncology, University of Heidelberg

Prof. Micheal Thomas is the Head of the Department of Thoracic Oncology at the Thoraxklinik - University of Heidelber. He chaired the German Lung Cancer Cooperative Group from 1995-2005 and designed and conducted large scaled phase III trials in the trimodality treatment setting of non-small cell lung cancer. He is dedicated to clinical and translational research and received in 2010 the John Mendelsohn Award for research in clinical trials of the German Cancer Society. He is board certified in internal medicine, hematology and oncology, pulmonology and palliative care. Prior to his move to Heidelberg, he hold a full professorship (C3) at the Medical Faculty of the University of Münster.

Inger Thune

Ulleval University Hospital

Inger Thune, MD, PhD is the chair of the "*Norwegian Energy Balance and Cancer Research Group*", Oslo University Hospital, Norway, including several research projects, masters, PhD's and postdoc's within oncology, biology and epidemiology.

Inger Thune is trained in Oncology and has a PhD in Epidemiology. At present she is a senior oncologist at the Oslo University Hospital, Norway and has positions in both clinical oncology and cancer research. Dr Thune has authored more than 100 publications as well as developed literature attached to the curriculum for Medical Schools in Norway. She is serving the Board of "Physical Activity and Health" in Norway and expert panels for evaluating optimal Cancer Rehabilitation program both on national and international level. In addition she serves on multiple international committees and editorial boards.

Dr.Thune's earliest publications were on physical activity and risk of several types of cancer using cohort studies. She has also focused on the complexity regarding assessment of physical activity. At present, she is using mechanistic studies, cohort studies as well as Randomized Clinical Trials (RCT's) focusing on energy balance and cancer risk and prognosis including gene-environment interactions.

Cornelia Ulrich

Director, National Center for Tumor Diseases (NCT) Heidelberg and Head, Division of Preventive Oncology, German Cancer Research Center (DKFZ), Heidelberg
Full Member, Fred Hutchinson Cancer Research Center and Professor, University of Washington, Seattle

Cornelia (Neli) Ulrich is since September 2009 Head of the Division of Preventive Oncology at the German Cancer Research Center and Director of the National Center for Tumor Diseases (NCT) in Heidelberg. She holds a Master's degree in Nutrition from Oregon State University (Fulbright Scholarship) and PhD in Epidemiology (DAAD Fellow). Since 1999, she is Professor at the Fred Hutchinson Cancer Research Center and University of Washington in Seattle.

Prof. Ulrich has authored more than 170 journal publications and book chapters and serves on multiple national and international committees, panels, and editorial boards, including Cancer Research and Cancer Epidemiology, Biomarkers and Prevention. Prof. Ulrich is known for her studies on the molecular epidemiology of colorectal cancer, with emphasis on folate, one-carbon metabolism and prostaglandin synthesis. Her group has conducted the first studies demonstrating pharmacogenetic effects of polymorphisms in one-carbon metabolism on anti-folate chemotherapeutics. Her current research suggests that, similarly, genetic variability in inflammatory pathways may allow tailoring of chemoprevention with non-steroidal anti-inflammatory drugs. Prof. Ulrich leads the international ColoCare Consortium, which investigates factors that influence the prognosis, treatment response and quality of life of colorectal cancer patients. Prof. Ulrich oversees the area 'Exercise and Cancer' at the NCT and investigates biological links between obesity, physical activity and cancer risk and cancer outcomes. This builds directly on her research evaluating biomarkers in exercise intervention studies, funded by the National Institute of Health's Transdisciplinary Research in Energy Balance and Cancer (TREC) Initiative.

Corinna Winter

Research fellow, Motion Analysis Lab, Orthopedic Department, University Hospital Münster

Corinna Winter is research fellow at the Motion Analysis Lab at the University Hospital in Münster since 2006. She finished her PhD on the "Level of Activity in Children Undergoing Cancer Treatment" in April 2010. She holds a Master's degree in Sports science and is a therapist using the means of sports.

Dr. Winter conducts several studies in the field of physical activity and ADL-monitoring in different patient groups. She is specialized on pediatric cancer patients and survivors of childhood cancer with special attention to patients with a malignant bone tumor.

She was mainly responsible for implementing activity enhancing intervention to the Department of Paediatric Haematology and Oncology at the University Children's Hospital Münster and for evaluating the effects of such interventions.

List of Attendees

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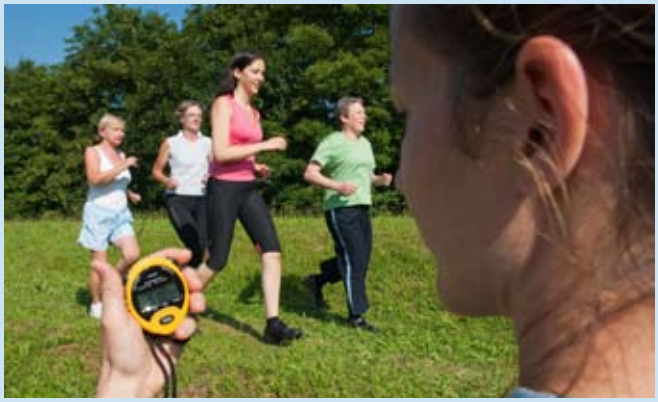

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