MEDIZINISCHE UNIVERSITÄT
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WORKING GROUP
Oncology and Hematology

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Gender differences?
Gender bias?
in Oncology and Hematology

2 Case Studies (F/M)

-death is the No.1-Killer

for all women and men **around the world**

M. Hochleitner

Awareness

Bild: http://www.br-online.de/umwelt-gesundheit/thema/herz/index.xml

- Heart death is **a male thing!**

M. Hochleitner

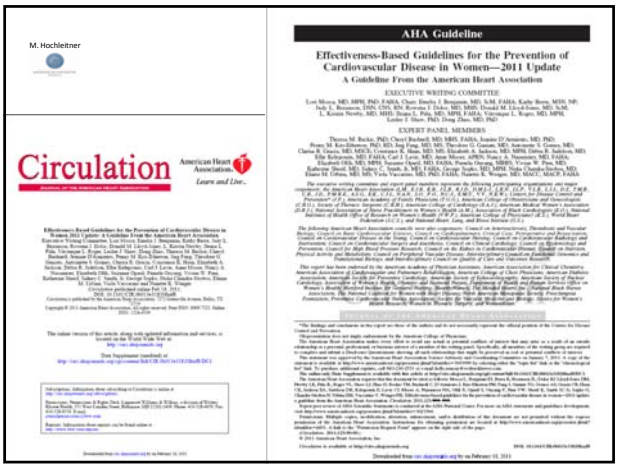
M. Hochleitner

„THE YENTL SYNDROME“

B. Healy
New England Journal of Medicine
Vol. 325, No. 4, 274-276, 1991

„Once a woman showed that she was just like a man, by having severe coronary artery disease …, then she was treated as a man would be.“

M. Hochleitner



Structure

Hochleitner/Fiegl/Thöni

1. Gender differences in prevention
2. Gender differences in epidemiology and cancer susceptibility
3. Gender differences in symptomatology and comorbidities
4. Gender difference in pharmakokinetics
5. Gender differences in prognosis and cancer treatment outcome
6. Gender differences in basic science

Hochleitner/Fiegl/Thöni

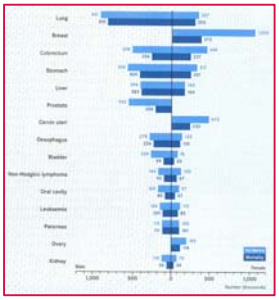
GENDER DIFFERENCES IN PREVENTION

Hochleitner/Fiegl/Thöni

Gender differences in epidemiology

Hochleitner/Fiegl/Thöni

Incidence and mortality of the most common cancers worldwide

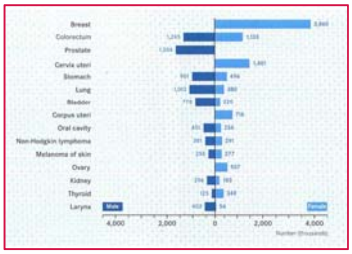


World Cancer Report, WHO, IARC Press, Lyon 2003, p13

Hochleitner/Fiegl/Thöni

Most prevalent cancers worldwide in 2000

expressed as thousands of persons diagnosed with cancer the previous five years

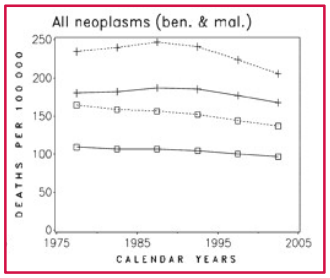


World Cancer Report, WHO, IARC Press, Lyon 2003, p14

Hochleitner/Fiegl/Thöni

Trends in age-standardised death certification rates per 100.000 in the European Union 1975–2004

Annals of Oncology



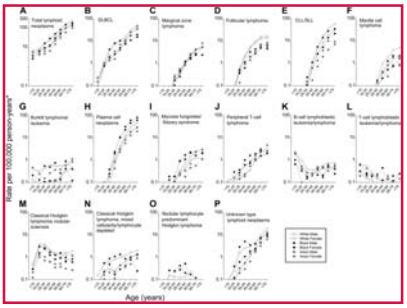
+++, men
□□□, women

——, 35-64 ys old
....., all ages

La Vecchia C et al., Ann Oncol 2009; Epub ahead of print

Hochleitner/Fiegl/Thöni

Incidence of lymphoid neoplasms by subtype, race, sex, and age, 12 SEER registries, 1992-2001



Morton et al. Blood 2006;107:265.

Hochleitner/Fiegl/Thöni

Gender differences in symptomatology and comorbidities

Hochleitner/Fiegl/Thöni

Gender difference in pharmakokinetics

Hochleitner/Fiegl/Thöni

Gender differences and drug therapy

M. Hochleitner

Dresser R: Wanted: single, white male for medical research. Hastings Cen Rep 1992; 22: 24-29.

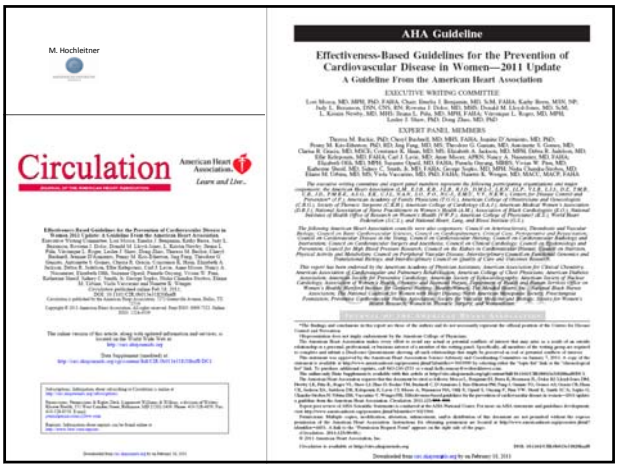


Table 1. Gender differences in pharmacokinetics for cytostatics and novel biologic antitumoral drugs

Substance	Measure	Outcome	Reference
5-FU	5-FU clearance	Lower in women	*Milano et al., JCO 1992; 1171*
5-FU (contin. infusion)	5-FU clearance	No sex difference	*Etienne et al., Eur J Cancer 1998, 34:92*
5-FU	Toxicity	Sex and age predictors	*Stein et al., Cancer 1995, 75:11*
Topotecan PO	Clearance	Lower in women	*Loos, Antiancer Drugs 11: 673*
Carboplatin	Dosing based on renal function-dependent formula	Women receive lower doses	*Dooley et al., Eur J Cancer 2002, 38:44*
Paclitaxel	Elimination capacity	Lower in women	*Joerger, Clin Cancer Res 2006, 12:2150*
5-FU, bolus injection	5-FU clearance Toxicity	Lower in women Higher in women	*Gusella M, Ann Oncol 2006;17:1656.*
Doxorubicin	Clearance	Higher in men	*Dobbs, Cancer Chemother Pharmacol 1995;36:473-6.*
Pegylated liposomal doxorubicin	Clearance	Higher in men	*La-Beck, Cancer Chemother Pharmacol. 2011 May 18. [Epub ahead of print]*
Temozolomide	Clearance	No sex difference	*Meany, Cancer Chemother Pharmacol 2009;65:137-42.*
Docetaxel, Paclitaxel, Etoposide, Topotecan	Hemato-toxicity: neutropenia	Increased risk in women	*Kloft, Clin Cancer Res 2006, 12:5481*
Sunitinib	Clearance	Decreased in women	*Houk et al., CCR 2009, 2497*
Erlotinib	Maximum plasma concentration, AUC, terminal elimination half-life	Increased in women	*Frohna, J Clin Pharmakol 2006, 46: 282*
Oxaliplatin	Clearance	Decreased in women	*Bastian, Anticancer Drugs 2003, 14:817*
Cisplatinum	Clearance	No sex difference	*De Jongh, Cancer Chemother Pharmacol 2004, 54:105-112*
Cis/Etoposide	Hemato-toxicity	No sex difference	*Miya, Cancer Chemother Phar 1998, 42:386*
Capecitabine metabolites	Clearance	Decreased in women	*Gieschke, J Pharmacokinet Phar-macodyn 2002, 29:25*
Bevaciumab	Clearance	Decreased in women	*Lu, Cancer Chemother Pharmacol 2008, 62: 779*
Panitumumab	Clearance	No sex difference	*Yang, Clin Pharmacokinet 2010; 49:729-40.*
Bendamustine	Clearance	No sex difference	*Owen, Cancer Chemother Pharmacol 2010;66:1039-49.*

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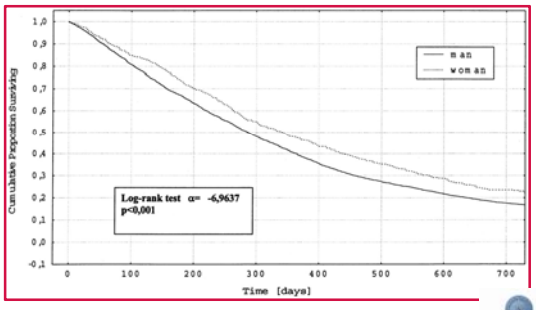
Gender differences in prognosis and cancer treatment outcome

Hochleitner/Fiegl/Thöni

Overall survival of lung cancer patients with relation to gender



Radzikowska E et al. Ann Oncol 2002;13:1087-1093

Hochleitner/Fiegl/Thöni

Gender differences in basic science

1. Gender differences in mouse models for lung adenocarcinoma
2. Gender differences in mouse models for liver cancer
3. Gender differences in Non Melanoma Skin Cancer

Hochleitner/Fiegl/Thöni

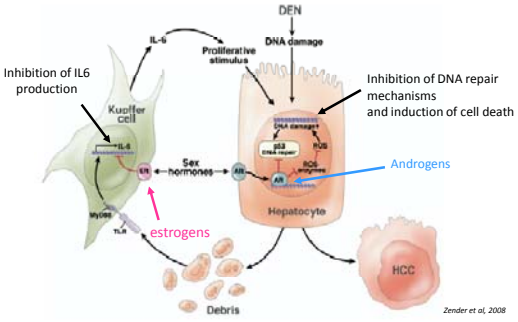


Figure 4: Estrogens protect female mice from liver cancer formation

Hochleitner/Fiegl/Thöni

Hochleitner/Fiegl/Thöni

Thank you very much

FOR YOUR ATTENTION