

Preface

Sex and gender differences in frequent diseases are more widespread than one may assume. In addition, they have significant yet frequently underestimated consequences on the daily practice of medicine, on outcomes and on choice and efficacy of therapies. Using gender-based approaches improves the quality of medical care. Understanding differences in symptoms of myocardial infarction and help-seeking behaviour in women and men leads to a more efficient and faster therapy in both genders. Knowing, for example, that exercise ECG has different sensitivity in subgroups of women and men lowers the threshold to use additional imaging procedures in subgroups of women with suspected cardiac ischemia. The knowledge that a drug has more adverse effects in one gender will affect dosing and choice of therapy. Knowing that some prevention strategies are more voluntarily accepted in women or men will lead to the design of gender-specific campaigns that are more efficient than global approaches.

Efficient pharmacotherapy is affected by pharmacokinetics, resorption, metabolism, distribution and excretion of a drug. These depend on body weight and composition, enzyme activities, organ perfusion and others, all of them differing significantly in women and men. In addition, efficacy and efficiency of drug therapy depend on underlying pathophysiology of a disease. Women and men are clearly similar in most of these parameters (as are mice, pigs and dogs to human) and therefore the majority of drugs that are developed in rodents work in humans of both sexes. Nevertheless, subtle and less subtle differences exist in brain function, in ion channels of heart and kidney, in energy and bone metabolism, in immune responses and in many more. They are due to acute “activational” effects of sex hormones as well as to “organisational” effects that sex hormones exert in utero in the developing foetus, leading to persisting epigenetic marks, and to differences in chromosomal activation between women and men. Disease-associated genes on X and Y chromosomes and sex-specific effects of genetic polymorphisms contribute to sex-specific disease susceptibility.

The more and more we are advancing and refining drug therapy, the more we have to adjust to these subtle differences. Therefore, optimizing drug therapy requires understanding of sex differences in pathophysiology. In addition to sex,

age and related hormonal status play a role. In cycling animals and in cycling women, the phase of the cycle influences a number of physiological parameters outside the reproductive organs.

Gender differences in disease manifestations also determine pharmacotherapy. If the pain threshold is low or a disease is considered life threatening, medications will be started earlier. If a risk factor is underestimated in one gender or gender-specific symptoms are not recognized, treatment may be delayed. Prescription habits depend on gender of patients and physicians and their interaction. Finally the estimated prevalence of a disease in the population influences attitudes in drug development and public health. Gender-based factors also determine the access to health care and the attitudes towards novel drugs.

This book aims at presenting the bases for sex- and gender-sensitive drug development and pharmaceutical therapy. We present sex and gender differences in mechanisms of disease, in pharmacokinetics, in drug development and use and in different therapeutic areas such as cardiology, neuropsychiatry, obesity and diabetes, anaesthetics and pain medication, anti-inflammatory and anti-rheumatic therapy and others. This book provides guidance for the practicing physician, for researchers in drug development, for insurance providers and for health-care authorities. We hope it will stimulate enthusiasm for novel aspects in pharmacotherapy that deserve greatest attention: sex and gender differences.

Berlin, Germany

Vera Regitz-Zagrosek

Sex and Gender Differences in Pharmacology

Regitz-Zagrosek, V. (Ed.)

2012, X, 602 p., Hardcover

ISBN: 978-3-642-30725-6