

Introduction

Osteoporosis in women

R. R. Recker

Creighton University, Osteoporosis Research Center, Omaha, NE , USA

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The Sun Valley Workshop this year opens with a session on osteoporosis in women, to be followed by a session on osteoporosis in men. The sessions will characterize the “state-of-the-art” in both genders with attention paid to the differences between them and the insights those differences may give in understanding skeletal biology and biomechanics.

The first session will be given by **Dr. Marcus** and will give an overview of current questions in osteoporosis. He will present his view of the status of the questions, and in the process give background that introduces the topics of subsequent speakers.

The subsequent speakers will be Drs. Cummings, Burr, Keaveny, Martin and Amling.

Dr. Cummings will examine the question whether osteoporotic fractures in women are on the increase. The first problem here is whether the absolute number of fractures is increasing and the answer to this is almost certainly yes. The real question, however, is whether the increase is due to the increasing numbers of our aging population or whether it is due to change intrinsic to skeletons of people as they are aging. Dr. Cummings will examine the current evidence on both of those. He will also discuss in some detail how and why does fracture risk change during drug treatments. This topic has created considerable controversy in the field, and exploration of the reasons for the apparent disconnect between antifracture efficacy and bone mass changes during anti-resorptive treatment may give insights into the biology and biomechanics of the skeleton.

Dr. Burr will examine bone material properties with an eye toward examining mineral matrix contributions to

fracture risk with age and contrast these with what is known about the differences in them between women and men. While the incidence of fractures in men is increasing, it is still much below the incidence in women. Is there a difference in bone material properties between women and men?

Dr. Keaveny will examine differences in the micro and macro structure of the skeleton between men and women. The first question is whether there is a difference and the second is whether the difference accounts for the sex differences in fracture risk between women and men, and finally, if there are differences, what might be the mechanisms for the differences?

Dr. Martin will examine the issue about whether skeletal size and structure have anything to do with fracture risk. Further, whether differences in size and structure allow generation of conclusions about the reasons for the difference in fracture risk between men and women, and whether they are due to differences in morphology.

Finally, **Dr. Amling** will discuss unique osteoporosis models with an eye toward exploring the mechanisms behind skeletal fragility.

The first session will be the starting point for subsequent discussions of the mechanism of skeletal fragility in both men and women, ranging from submicroscopic through microscopic and macroscopic morphology and extending to dynamic function. For example, we will have discussions regarding mechanosensing and transduction, genetics of mechanical loading sensitivity, the role of osteocytes in mechanosensing, skeletal development, and neurotransmitter functions.