



PRINCIPE FELIPE
CENTRO DE INVESTIGACION

THE FUTURE OF BIOMEDICAL RESEARCH

CIPF Lecture Series

Sex, metabolism and health

Speaker: **Prof. Adriana Maggi**

University of Milan, Italy

Date: **25/01/19- 12:30 h**

Place: Salón de Actos CIPF

Abstract: In the last three decades we witnessed dramatic changes in the way we design and identify new therapies: engineered proteins and antibodies enabled to aim at very specific targets with a precision never seen before; on the other hand, novel therapeutic targets are offered by the application of the new research tools such the 'omics and genetic engineering. However, by focusing on single molecules, the risk is to forget the relevance of the entire organism for a successful, efficacious and safe therapy. For instance, we are not taking into the necessary consideration the major physiological differences that in mammals arose as a consequence of the evolutionary leap associated with the change in the reproductive strategy. Growing the embryo in the mother womb and lactation of the newborn must have selected in female mammals novel control mechanisms for the metabolic, immune, nervous, cardiovascular and skeletal systems. This evolutionary selection must have created a major divergence between female and male physiology, but in the era of precision medicine, we still know very little about male *versus* female physiology.

By extensive application of metabolomics paired to transcriptomics we showed major differences in male and female strategies to face fasting or exposure to unhealthy diets. For instance, in case of short-term fasting, the decision to maintain lipid synthesis using amino acids (AA) as a source of fuel is the key discriminant for the hepatic metabolism of male and female mice; alternatively, when exposed to high fat diet female, but not male liver is able to utilize strategies preventing the creation of unhealthy fat deposits. Pharmacological and genetic interventions indicate that the hepatic estrogen receptor (ER α) has a key role in this sex-related strategy that is primed around birth by the aromatase-dependent conversion of testosterone into estradiol. This energy partition strategy, possibly the resultant of an evolutionary pressure enabling mammals to tailor their reproductive capacities on the nutritional status, is most important to direct future sex-specific dietary and medical interventions.

References

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