Sex differences in kidney gene expression

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Male and female rats show different patterns of kidney gene expression throughout their lives, a study in the open access journal *Biology of Sex Differences* reveals. The finding could help explain some of the gender differences observed in human renal disease, and lead to improved biomarkers of kidney function.

Our kidneys play many important physiological roles. They filter waste products from the blood, produce urine, regulate blood pressure and make hormones. It's accepted that men and women experience renal disease differently – sex differences have been spotted in acute, chronic and diabetic kidney disease and in response to renal toxins - but the mechanisms responsible for these differences are unclear.

James C. Fuscoe and colleagues at the National Center for Toxicological Research, USFDA, Jefferson, AR studied gene expression in the kidneys of male and female rats from 2 weeks to 2 years old, and identified over 800 genes that were expressed at different levels between the sexes. The findings help to explain what's happening at the molecular level, inside the kidney, as the rats age. Many of the differentially expressed genes were involved in pathways linked to renal injury, drug metabolism, and immune cell and inflammatory responses.

Expression levels of many of these genes also varied across the lifecycle. 'Middle-aged' females expressed higher levels of genes involved in xenobiotic metabolism and endocrine function, whilst males of the same age expressed higher levels of genes related to oxidative stress and renal cell death. So together, the findings may help explain some of the gender differences seen in human patients.

There are currently half a dozen urinary biomarkers of kidney injury qualified by the FDA. Dramatic sex differences were also spotted in the expression of genes encoding these biomarker proteins, a finding that should be taken into account as current biomarkers are used, and new biomarkers are developed.

More information: Sex differences in kidney gene expression during the life cycle of F344 rats, Joshua C Kwekel, Varsha G Desai, Carrie L Moland, Vikrant Vijay and James C Fuscoe, *Biology of Sex Differences* 2013 4:14, doi:10.1186/2042-6410-4-14

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