

Mouse ovaries and testes age in unique ways

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Aging leads to large changes in gene activity in the ovaries of mice, but only limited changes in testes, according to research published in the open-access journal, BMC Biology. A lifespan-extending calorie-restricted diet reversed some of the aging effects – but, unlike the widespread changes observed in somatic organs, it had an impact only in a small number of gonad-specific genes.

As well as tackling one of the key questions of ageing – by exploring if reproductive organs age in the same way as other body organs – this research is important in the light of the trend for some women in developed countries to put off childbearing until later in life.

A research team led by Minoru Ko, MD, PhD, from the National Institute on Aging, Baltimore, USA used whole-genome DNA microarrays to study the effects of age, sex and diet on the global gene expression in mouse ovaries and testes. They found that reproductive organs age in a different way to other body tissues and, furthermore, that ovaries age in a different way from testes.

Age-related changes in gene expression occurred in gonads – as they are known to in other body tissues – but these changes tended to be in different classes of genes. Only two of the six categories of genes previously associated with aging in muscle, kidney and brain were associated with aging in the ovary; none were associated with aging in the testis. The changes seen in ovaries could be influenced by changes in the tissue composition of ovaries as females age and ovulation ceases.

The researchers also found that calorie restriction in females reduced the expression of genes involved in metabolism and follicle growth, which seems to be consistent with a popular view that the calorie restriction causes a shift in energy use away from reproduction towards general body maintenance and repair. However, male mice on the same diet did not appear to sacrifice reproductive function, suggesting an evolutionary difference between males and females when coping with a food shortage.

Source: BioMed Central

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