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Role of Studying Telomere Length in Male Factor Infertility-Recent Advances: A Short Summary

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Short Communication

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Short Communication

Trying to study the male factor, regarding infertility one can't find the cause of spermatogenic failure in approximately 75% of cases on the clinical tests in hand [1]. One is forced to think that these so called idiopathic spermatogenic failure are caused by genetic factors. Several genes have been associated with non-obstructive azoospermia, with >1200 genes linked to male infertility in both human as well as animal studies [1]. However not many of these genes get tested routinely clinically ,reason being these genes have not been validated in human males, or have failed validation or are associated with non-obstructive azoospermia, and are rare variants ,instead of the disease causing variants [1]. Although trying to identify individual genes that cause over 5% of non-obstructive azoospermia cases is important as far as researchers studying the field of male infertility are concerned, it is difficult for them to do so, as both size required as well as time needed to validate these limits these studies. Thus the alternative remains trying to study the common molecular pathways which might get disturbed by the underlying genetic variants, these molecular changes might be easier to study and might offer better ways of screening or trying to treat these men who come with infertility.

Telomeres represent evolutionary conserved hexametric tandem repeats, which are located at the ends of eukaryotic chromosomes that have the capacity of preventing end degradation and maintaining genomic integrity [2]. Thus Yang et al tried to study leukocyte telomere length in men presenting with idiopathic infertility which is one such molecular change. They found that men having idiopathic non obstructive azoospermia had markedly shorter telomere length as compared to control men having obstructive azoospermia or men having normal semen parameters that was following adjustment for age and BMI [3]. Ageing is a well-known factor to have a relationship with telomere length, various other health related associations that includes a >risk for cancer and worse overall health, all have had a proven relation to shortened telomere length [4,5]. Though Yang, et al. [3] have not studied for comorbidities, including cancer in the population they studied the total relationship between the degree of shortened telomere length and the extent of spermatogenic failure is remarkable. The biggest change found in this study is the relative change in leukocyte telomere length between a man having normal semen analysis and a man having non obstructive azoospermia is roughly the difference one finds between a man of 30 year and a 50 year old man.

This study by Yang, et al. [3] shows an association between altered telomere length and spermatogenic failure and not as a causative factor. Ozturk, et al. [6] studied the relationship of telomeres and spermatogenesis and found that telomeres keep lengthening from spermatogonia to spermatozoa, but what regulates these changes in telomere elongation and telomerase activity is still not clear [6]. Still the study by Yang, et al. [3] gives an important association between

shortened leukocyte telomere length and male infertility, since they studied a large population of homogenous infertile men and had proper control group.

Further the relationship between male infertility and overall health is explored in this study. The relationship between association of male infertility and associated comorbidities had been earlier studied by Eisenberg, et al. [7], in this study Yang, et al. [3] further find that the leukocyte telomere length is shorter in men having non obstructive azoospermia as compared to men with normal semen parameters. This adds to the evolutionary reproductive hypothesis that males having poor health/those that have any underlying genetic conditions are not good for the reproductive pool, and hence nature has evolved cellular mechanisms to decrease the chances of reproduction in these men. Thus in the modern post reproductive evolutionary world, these mechanisms of decreasing fertility might help in early diagnosis of male infertility along with pointing out men that might be at increased risk of worsening of health as their age increases. A finding of telomere length of men having non obstructive azoospermia is roughly comparable to that of a normozoospermic man who is 20 years older further intensifies the concern that these infertile men are at risk of bad overall health and early mortality.

Hence although no specific new genes have been found by this study, there is confirmation of association between male infertility and short leukocyte telomere length-i.e. a molecular/genetic pathway which might be affected by various underlying changes or overall poor health of a person. More research is needed to find if clinical testing for telomere length should be done in infertile males and are there any treatment options, present for such men in who shortened telomere length is present that can improve fertility outcome [8]. In all this study further adds to the literature that suggests male infertility is a marker of overall male health and hence the treating doctors need to counsel the men regarding potential long term effect on health, stress prevention, take up a healthy lifestyle and stimulate them to consult primary care physician. More work might highlight the role of clinical diagnosis of infertility and doing molecular diagnostics that include genetic, epigenetic and other molecular markers which will give us a more comprehensive way of assessing molecular changes with respect to enhancing the life span and give an individualized approach for long-term health. Besides that one further advantage of knowing relationship of telomere length with regards to male factor infertility is that it has been found sperm separation by density gradient might be beneficial with regards to giving longer telomere length spermatozoids [8,9].

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