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The *in vivo* effects of *Eurycoma longifolia* Jack on reproductive functions in hypogonadal Sprague-Dawley rats

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INTRODUCTION: In South East Asia, the roots of *Eurycoma longifolia* (EL) are medicinally used by traditional healers in the treatment of various ailments and for its reported aphrodisiac properties. Nevertheless, studies investigating the *in vivo* effects of treatment with this extract on male reproductive functions, particularly its effects on spermatozoa, are limited to sperm motility and sperm concentration or to the serum testosterone concentration

AIM: To date, studies investigating the *in vivo* effects of treatment with this extract on male reproductive functions, particularly its effects on spermatozoa, are limited to sperm motility and sperm concentration or to the serum testosterone concentration. This study is aimed at investigating the effects of TA on total body and organ weight, lean muscle and omentum fat mass, functional and kinetic sperm parameters, as well as serum testosterone, estradiol and insulin concentrations using a hypogonadal model.

MATERIALS AND METHODS: Thirty male rats aged 5-7 months old were force-fed the TA extract at a volume of 200µl per day for 52 days to determine the phytoandrogenic effect of the TA extract on hypogonadism. Furthermore, animals were segregated into a control and two experimental groups (200 and 800 mg kg⁻¹ BW, respectively), consisting of 10 animals per group. Functional and kinetic sperm parameters were investigated immediately subsequent to euthanization, and rat aortal blood was aspirated for serum analysis of the serum testosterone, estradiol and insulin concentration.

RESULTS: Total body weight (BW) was significantly reduced (P=0.0315), together with a highly significant (P<0.0001) decrease in omentum fat weight in the dosage groups. Epididymal, prostate and testes weight remained unchanged in the dosage groups compared to the controls. Moreover, testosterone concentration displayed no significant (P<0.05) change, whilst a cumulative trend (P=0.0832) in lean gastrocnemius muscle weight was observed in the treatment animals. Estradiol concentration was not significantly affected subsequent to treatment with the TA extract, whilst a significant (P=0.0023) surge in serum insulin concentration was observed in the experimental groups. Furthermore, for the functional parameters assessed, sperm concentration was significantly improved (P=0.0002), coupled with significant (P=0.0041) proliferations in mitochondrial membrane potential (MMP) between the control and treatment groups. Treatment with the TA extract elicited no deleterious effect on sperm morphology and did not induce sperm DNA fragmentation. Moreover, for the kinetic parameters, significant increases in total (P=0.0005), progressive (P=0.0051) and rapid (P=0.0133) motility were observed.

CONCLUSION/DISCUSSION: This study clearly demonstrates the potential phytoandrogenic and pro-fertility effects of the TA root extract in terms of sperm functions, and may have further implications in enhancing the quality of life in aging men.