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### GnRH主动免疫对雄性大鼠垂体-睾丸轴功能的影响

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摘要:

本研究用GnRH并列体二聚物 (GnRH-TDK) 主动免疫SD雄性大鼠观察其对大鼠垂体-睾丸轴功能的影响,以探讨GnRH主动免疫去势的分子机理。24只性成熟SD雄鼠随机分为免疫组和对照组,免疫组雄鼠于12周龄时初免,8周后加免,对照组雄鼠不做任何注射。每两周采集血液放免法检测血清抗体滴度及激素含量变化。加免后4周脱颈处死所有雄鼠,收集垂体、睾丸实时荧光定量PCR分析相关生殖基因mRNA的变化。结果显示,GnRH主动免疫后12只免疫雄鼠中11只血清GnRH抗体滴度显著上升,血清LH、FSH及睾酮 (T) 均极显著下降到检测限附近或以下 ( $p<0.01$ ),同时睾丸严重萎缩,其重量及体积下降到对照组睾丸的20% ( $p<0.01$ ),组织切片显示,曲细精管上皮组织严重受损,管内仅有少数退化的精原细胞。与对照组相比,GnRH主动免疫极显著下调雄鼠垂体GnRH受体、LH- $\beta$ 、FSH- $\beta$ 和睾丸LH受体及FSH受体mRNA表达水平 ( $p<0.01$ )。由此可见,GnRH主动免疫可通过下调垂体GnRH受体、促性腺激素亚基及睾丸LH、FSH受体基因表达,影响垂体-睾丸轴的功能。

关键词: GnRH 主动免疫 垂体睾丸轴 大鼠

### Effects of Active Immunization against GnRH on Functions of the Pituitary-Testicular Axis in Adult Male Rats

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Abstract:

The present study was designed to investigate effect of active immunization against GnRH-Tandem-Dimer (TDK) on functions of pituitary-testicular axis in adult male rats. Twenty-four adult male Sprague-Dawley (SD) rats were randomly allocated to two groups of 12 each. One group was immunized at age of 12 weeks with a booster vaccination 8 weeks later. Another group were not administrated and served as intact controls. All rats were decapitated at 4 weeks after booster vaccination, blood samples for antibody titter and hormone assays were collected once of every 2 weeks to determine serum anti-GnRH antibody titers and reproductive hormone levels by radioimmunoassay (RIA). At autopsy, pituitary and testes were collected to detect the mRNA expressions of reproduction-related genes using real-time fluorescence quantitative PCR technique. The results showed that eleven immunized rats responded well to the immunization (immunocastrates). In immunocastrates, serum gonadotropins (LH and FSH) and testosterone (T) levels were declined following vaccination, and were significantly decreased to low or non-detectable levels as compared with controls ( $p<0.01$ ). Testes in immunocastrates were decreased to 20% of both the average weight and volume of intact controls at autopsy ( $p<0.01$ ), and testicular histological evaluation displayed severe damage of interstitial tissue and arrest of spermatogenesis. In contrast to intact controls, mRNA expression levels in pituitary GnRH receptor (GnRH-R), LH- $\beta$ , FSH- $\beta$ , testicular LH receptor and FSH receptor in immunocastrated animals were significantly down-regulated after immunization ( $p<0.01$ ). Together, the functions of pituitary-testicular axis were disrupted by active immunization against GnRH through down-regulating gene expressions of pituitary GnRH-R, LH- $\beta$  and FSH- $\beta$ , and LH-R and FSH-R in testes.

Keywords: GnRH Active immunization Pituitary-testicular axis Rat

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