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Sex-dependent impairment of antibody responses to tick-borne encephalitis virus vaccination and infection in obese mice

Inhalt

Obesity is a growing global health concern with profound effects on immune function and vaccine efficacy. This study investigated the impact of obesity on immune responses to tick-borne encephalitis virus (TBEV) vaccination and infection using a mouse model. Mice fed a high-fat diet (HFD) developed increased body weight, fat mass and pre-diabetic features compared to standard chow diet (SCD) controls. Following vaccination with the TBEV vaccine (Encepur), HFD mice showed reduced TBEV-specific IgG titres and lower neutralizing antibody levels relative to SCD mice. Splenocyte counts normalized to organ mass were higher in vaccinated SCD mice, consistent with their stronger humoral response. After TBEV infection, HFD mice did not exhibit greater disease severity or higher viral titres in serum, spleen or brain, indicating that obesity did not enhance viral replication. A sex-dependent effect emerged: male HFD mice mounted antibody responses comparable to SCD males, whereas female HFD mice displayed markedly impaired IgG and neutralizing antibody production compared to female SCD mice and both male groups. These findings highlight a complex interplay between obesity, sex and immune function, with obesity disproportionately impairing the immune response after TBEV vaccination and infection.

Keywords

immune response; obesity; tick-borne encephalitis; tick-borne encephalitis virus; vaccination

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No, I am not a Junior Scientist.

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