A5T-mutated Human alpha-Synuclein is Involved in Blood Glucose Regulation of Western Type Diet-fed Parkinson’s Disease Mice

Magdalena Daurer1, 2, Roland Rabl1, Heinrich Roemer2, Birgit Hutter-Paiер1
1QPS Austria GmbH, Grambach, Austria; 2Karl-Franzens University of Graz, Institute of Zoology, Austria

BACKGROUND

Besides genetic modifications, diabetes and obesity have been suggested to be a risk factor for the development and progression of Parkinson’s Disease (PD). To better understand the impact of diabetes and obesity caused by diet and PD, we focused on investigating the effects of a Western type diet (WTD) that contains high fat and sucrose, as well as supplemented cholesterol on a PD animal model, the A5T mouse.

MATERIALS and METHODS

Transgenic mice overexpressing human A5T-mutated alpha-Synuclein (A5T) and non-transgenic littermates (NTG) received a control diet (CD) for 2 weeks, starting at 3 months of age. Afterwards animals were fed a WTD or control diet (CD2) until the end of their life. To monitor the animals’ response to the diet, the food intake, and body weight were evaluated weekly. Additionally, glucose metabolism was investigated using the intraperitoneal glucose tolerance test (ipGTT) after 5, 11, 26, and 34 weeks on the diet.

RESULTS

Both, NTG and A5T mice on WTD had a higher caloric intake which resulted in an elevated weight gain compared to CD-fed control animals (as shown in Figure 2). Intriguingly, fasting blood glucose levels were increased only in NTG mice already as early as 5 and 26 weeks on the WTD (Figure 3). Injecting a glucose solution intraperitoneally led to higher blood glucose levels in WTD-fed A5T and NTG mice 5 and 11 weeks after starting the dietary intervention. However, after 26 weeks, only NTG mice demonstrated elevated glucose levels. After 34 weeks on the diet, none of the groups demonstrated elevated glucose levels in the ipGTT (Figure 4).

SUMMARY and CONCLUSION

In summary, our findings add evidence indicating an impact of A5T-mutated human alpha-Synuclein on glucose regulation. Further research on this topic might pave the road for new therapeutic approaches in the field of PD.

For more information about the model please visit: www.qpsneuro.com or send us an e-mail: office-austria@qps.com

© 2021 QPS. Confidential. All rights reserved.