OVERVIEW OF RESEARCH: Thyroid histology in orangutans with non-congenital thyroid dysfunction

Limited published information is available for thyroid function in clinically normal higher primates and virtually no data are available on thyroid autoantibodies. Moreover, there are only a few reports in the literature on non-congenital thyroid dysfunction, namely hypothyroidism in a gorilla (1,2), a chimpanzee (3) and two orangutans (4,5) and hyperthyroidism in one gorilla (6). Because of the paucity of available information, the etiology of hypothyroidism and the single case of hyperthyroidism in the great apes are unknown. We have recently reviewed the information available on thyroid function and dysfunction in great apes (7).

To investigate thyroid function and provide “normal ranges” for orangutans, gorillas and chimpanzees, we are currently testing sera for:

a) Thyroid hormone levels (thyroxine, tri-iodothyronine, thyrotropin)

b) Thyroid autoantibodies (autoantibodies to thyroglobulin, thyroid peroxidase and the thyrotropin receptor).

Sera for these studies have been generously made available by veterinarians (with approval from their institutions). In addition, Dr. Richard Eberle (Professor of Virology, Department of Veterinary Pathobiology, Center for Veterinary Health Sciences, Oklahoma State University) generously transferred to us the “archive” of primate sera he obtained in the late 1980’s for his studies of antibodies to herpesviruses.

In addition to the data we obtain from sera, important insights may come from thyroid tissue, available at autopsy, from orangutans with non-congenital thyroid dysfunction.

SPECIFIC AIMS OF THE PROJECT

Our goal is to obtain thyroid tissue (1-2 grams), available at autopsy, from orangutans with suspected or diagnosed non-congenital thyroid dysfunction. The tissue would be used to prepare histological sections to provide information on the etiology of the thyroid dysfunction.

We have been informed of two orangutans currently being treated for hypothyroidism (personal communication from Dr. Hayley Murphy, Atlanta Zoo). Orangutans in other zoos may also suffer from thyroid dysfunction. Although this project may be “a long shot”, if successful, we may obtain valuable information for future treatment of orangutans with similar health problems.

METHODOLOGY

a) Small pieces of thyroid tissue removed at autopsy will be fixed (in formalin), stored and later shipped to our laboratory (at our expense, see below).

b) We will send the tissue to a laboratory that specialises in handling animal tissues (RADIL, 4011 Discovery Drive, Columbia, MO 65201). The project has been discussed with the director of RADIL Cynthia Besch-Williford, DVM, PhD. Dr. Besch-Williford has previously prepared histological sections
from other primate tissues and has agreed to prepare thyroid sections from orangutan thyroid tissue that becomes available to us. The sections will be stained with hematoxylin and eosin and mounted with cover slips. Remaining paraffin tissue “blocks” will be returned to us with the prepared slides.

c) Slides with stained thyroid sections will be examined by Dr. Basil Rapoport. Dr. Rapoport is the co-director of the Autoimmune Thyroid Disease Unit at Cedars-Sinai Medical Center. He is an NIH grant holder, a co-PI on my NIH grant and we are co-authors on many studies in thyroid autoimmunity. In addition to his basic research, Dr. Rapoport has many years experience as a clinical endocrinologist, specializing in thyroid autoimmune disease. He is familiar with histology of the thyroid gland in humans, particularly in individuals with autoimmune thyroid disease.

d) We cannot predict how many samples are likely to become available to us within a three year period (2012 to 2015). However, even a single sample of thyroid tissue from a deceased orangutan with thyroid dysfunction will be valuable, assuming that we are provided with information on clinical status and, if possible, data for thyroid hormone tests on serum samples from the orangutan.

e) Any “left-over” tissue will be retained in our laboratory until the end of the study and then returned to the SSP (if required) or discarded in a biohazard bag (in accordance with the policy of our institution).

SIGNIFICANCE OF THE PROJECT

Information from this study, together with available clinical information, will provide insight into the etiology of thyroid dysfunction in orangutans. For example, the presence of extensive lymphocytic infiltration in the thyroid will support an autoimmune aetiology of disease.

Most important, the information obtained may be useful for the future treatment of orangutans with similar health problems.

REFERENCES


STATEMENT OF ASSURANCE
Fixed thyroid tissue will not pose a problem to us or to RADIL, the laboratory which will prepare and stain the thyroid tissue sections. Any "left-over" tissue will be returned to us, retained in our laboratory until the end of the study and then returned to the SSP (if required) or discarded in a biohazard bag (in accordance with the policy of our institution).

ACKNOWLEDGEMENTS

Information about thyroid histology will be made available to the SSP. In any publication, we will acknowledge the cooperating institutions and the Orangutan SSP as follows:-

"We thank the following veterinarians and the orangutan SSP who generously provided us with information about great ape health and generously provided us with thyroid tissue:- Dr. X. Smith etc”.

Suggestions for amending this statement will be adopted.

Note: If a veterinarian provides extensive information, he or she might become a co-author on a published study.

A current curriculum vitae for Sandra McLachlan (Principal Investigator) is attached.

SHIPPING INSTRUCTIONS

a) Fixed thyroid tissue should be sent in a zip-loc plastic bag (or other sealed plastic bag), in a polystyrene container, packed with brown paper or polystyrene "chips" to prevent movement of the sample.

b) Please ship by Fed Ex; account (number 2535-7696-0), marked next day delivery. To avoid delays, it is best to ship the package on Monday or Tuesday.

c) The package should be addressed to:-

Sandra M. McLachlan and Holly Aliesky
Cedars-Sinai Medical Center
8700 Beverly Blvd, B-131
Los Angeles CA 90048
Phone: 310-423-7680; 310-423-7676

d) Prior notification about a shipment (tracking number) to me and Holly aliesky:-
emails: mclachlans@cshs.org

PERMITS AND/OR LICENCES

Not applicable