
Form and Function

Seasonal features of humoral immune response to T-cell dependent antigen in palaeartic hamsters (*Rodentia, Cricetinae*)

Ekaterina V. Kuznetsova¹, Natalia Tikhonova², Natalia Yu Feoktistova¹

¹Severtsov Institute of Ecology and Evolution, Moscow, Russia, kuznetsovaekvl@gmail.com

²Research Institute of Human Morphology, Moscow, Russia

It is well documented that immune function varies substantially on a seasonal basis. The autumn–winter season is the most critical period for animals. Non-tropical animals have evolved specific adaptations to cope with winter energy shortages. Animals can overcome periods of unfavorable environmental conditions by physiological hypothermia (daily torpor/ hibernation), characterized by strongly reduced metabolic rate and body temperature. Studies from mammals indicate that hibernation affects both the innate and adaptive immune systems. During winter representatives of subfamily *Cricetinae* demonstrate different types of hypothermia: (a) long-term hibernation (e.g. *Cricetus cricetus*); (b) nonstandard short hibernation with irregular bouts of normothermia (*Allocrietulus* sp.); and (c) daily torpor (*Phodopus* sp.). It is the first attempt to compare humoral immunity of the animals with different overwintering strategies. We analyzed seasonal changes in humoral adaptive immune response to a T-cell dependent antigen (KLH) in hamsters with different types of hypothermia. The animals were housed individually under natural light and temperature conditions (outdoor enclosures). The group of ten males of each hamster species was immunized in each season with KLH. Blood samples were taken on day 10. To assess humoral immunity, serum anti-KLH IgG concentrations were assayed using an ELISA according to the method of Drazen et al. with our modifications. The humoral immunity declined during the autumn-winter season and rose in spring (termination of hibernation and onset of reproduction) in hibernating hamster species. Whereas species with daily torpor demonstrated the highest level of specific antibody in autumn, but it decreased in winter and spring. Thus we suggest that humoral immunity is compromised during hibernation in *C. cricetus* and *Allocrietulus curtatus*, but not in breeding season (as trade-off hypothesis predicted), while torpid species (*Phodopus sungorus*, *Phodopus roborovskii*) enhanced their immune function (in autumn) in order to counteract the immunosuppressive effects of stressors that occur in winter (low ambient temperatures and reduced food availability). Supported by a RFBR grant № 17-04-01061.

4 5 9

Julius-Kühn-Archiv

Jens Jacob, Jana Eccard (Editors)

6th International Conference of Rodent
Biology and Management
and
16th Rodens et Spatium

Potsdam, Germany, 3-7 September 2018

Book of Abstracts



Julius Kühn-Institut
Bundesforschungsinstitut für Kulturpflanzen

4 5 9

Julius-Kühn-Archiv

Jens Jacob, Jana Eccard (Editors)

6th International Conference of Rodent
Biology and Management
and
16th Rodens et Spatium

Potsdam, Germany, 3-7 September 2018

Book of Abstracts



Editors:

Jens Jacob¹ and Jana Eccard²

¹Julius Kühn Institute, Federal Research Centre for Cultivated Plants,
Institute for Plant Protection in Horticulture and Forests, Vertebrate Research,
Toppeideweg 88, 48161 Münster, Germany

²University of Potsdam, Institute of Biochemistry and Biology,
Animal Ecology Group, Maulbeerallee 1,
14469 Potsdam, Germany

Local Organizing Committee:

Jana Eccard, University of Potsdam

Jens Jacob, Julius Kühn Institute, Federal Research Centre for Cultivated Plants, Münster

Daniela Reil, Julius Kühn Institute, Federal Research Centre for Cultivated Plants, Münster

Christiane Scheffler, University of Potsdam

Elke Seydewitz, University of Potsdam

Scientific organising committee:

Emil Tkadlec (Czech Republic); Frauke Ecke (Sweden); Grant Singleton (Philippines); Heikki Henttonen (Finland); Jana Eccard (Germany); Jens Jacob (Germany); Lyn Hinds (Australia); Prince Kaleme (Congo); Xavier Lambin (UK); Zhibin Zhang (China)

International Steering Committee Rodens et Spatium:

Abraham Haim (Israel); Alexey Surov (Russia); Ana Maria Benedek (Romania); Boris Krasnov (Israel);

Emil Tkadlec (Czech Republic); Éric Le Boulengé (Belgium); Farida Khammar (Algeria);

František Sedláček (Czech Republic); Gert Olsson (Sweden); Grant Singleton (Australia);

Heikki Henttonen (Finland); Jan Zima (Czech Republic); Jean-François Cosson (France); Linas Balčiauskas

(Lithuania); Maria da Luz Mathias (Portugal); Molly McDonough (USA); Mustafa Sözen (Turkey);

Nigel Yoccoz (Norway); Olga Osipova (Russia); Takuya Shimada (Japan); Victor Sánchez Cordero (Mexico);

Xavier Lambin (United Kingdom); Yasmina Dahmani (Algeria)

International Steering Committee**International Conference of Rodent Biology and Management:**

Andrea Byrom (New Zealand); Charley Krebs (Canada); Grant Singleton (Philippines); Jens Jacob (Germany);

Jiqi Lu (China); Lyn Hinds (Australia); Nico Avenant (South Africa); Peter Banks (Australia);

Peter Brown (Australia); Regino Cavia (Argentina); Rhodes Makundi (Tanzania); Roger Pech (New Zealand);

Steven Belmain (UK); Sudarmaji (Indonesia); Zhibin Zhang (China)

Bibliografische Information der Deutschen Nationalbibliothek

Die Deutsche Nationalbibliothek verzeichnet diese Publikation

In der Deutschen Nationalbibliografie: detaillierte bibliografische

Daten sind im Internet über <http://dnb.d-nb.de> abrufbar.

ISSN 1868-9892

ISBN 978-3-95547-059-3

DOI 10.5073/jka.2018.459.000



Alle Beiträge im Julius-Kühn-Archiv sind unter einer

Creative Commons - Namensnennung - Weitergabe unter gleichen Bedingungen -

4.0 Lizenz veröffentlicht.

Printed in Germany by Arno Brynda GmbH, Berlin.