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Cross-reaction of Anti-cattle Globulin Serum with Wisent Globulins

Krzyżowe reakcje antyglobulinowej surowicy bydła z globulinami żubra

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[With 1 Table]

Investigations on antigenic blood properties in wisent were commenced in 1957 on the initiative of the late Professor Dr. M. Czaja. The research program included among others investigation of the antigenic relationship between the gamma-globulins of the wisent, *Bison bonasus* (Linnaeus, 1758) and domestic cattle, *Bos taurus dom.* Linnaeus, 1758 sera. The results presented in this communication are fragments of the work on this subject.

Basing on the general principle that serum proteins of any animal species possess a so-called serologic specificity, i.e. an antigenic specifity, a series of tests was performed for determining the differences or similarities between the serologic properties of the respective sera. One of the elements of this work was the study of cross-reaction between anti-cattle-globulin immune serum with globulins of wisent serum. The general scheme of the experiment was based on the method described by Allison & Morton (1953) who, utilizing the antigenic specifity of gamma-globulin, developed a suitably sensitive and specific reaction between the respective antigenic substances and the corresponding antibodies. In investigation on the differences or similarities between sera properties of particular animal species, the use of this method was conditioned on obtaining specific antibodies corresponding to the given experimental system. Dubiski (1958) used this method (with appropriate modifications) in studies on antigenic properties of immune globulins.

In the experiment on cross-reactions cattle and wisent sera were used, and also, for comparison, the sera of several other animals. The system of the experiment is presented in Table 1, containing also the results.

The first component of the given system was cattle immune serum with antibodies against sheep red cells. The antibodies were obtained through immunization of the cow with sheep red cells. The antibodies thus

Table 1.

Neutralization of antibodies against anti-cattle-globulin serum.

Anti-cattle-globulin serum neutralized with serum		Agglutination of sheep red cells sensitized with anti-sheep cattle immune serum								
of	diluted 1:	Dilution of anti-cattle-globulin serum 1: 20	40	80	160	320	640	1280	2560	5120
Cattle	10	—	—	—	—	—	—	—	—	—
	50	—	—	—	—	—	—	—	—	—
	100	+	+	+	+	+	—	—	—	—
	500	+	+	+	+	+	+	+	—	—
	1000	+	+	+	+	+	+	+	+	—
Wisent	10	+	+	+	—	—	—	—	—	—
	50	+	+	+	—	—	—	—	—	—
	100	+	+	+	+	+	—	—	—	—
	500	+	+	+	+	+	+	+	—	—
	1000	+	+	+	+	+	+	+	+	—
Red deer	10	+	+	+	+	+	+	—	—	—
	50	+	+	+	+	+	+	—	—	—
	100	+	+	+	+	+	+	+	+	—
	500	+	+	+	+	+	+	+	+	—
Sheep	10	+	+	+	+	+	+	+	+	—
Horse	10	+	+	+	+	+	+	+	+	—
Pig	10	+	+	+	+	+	+	+	+	—
Wild boar	10	+	+	+	+	+	+	+	+	—
0.90% NaCl solution	10	+	+	+	+	+	+	+	+	—

+ Agglutination, — No agglutination.

obtained were added to sheep cells and yielded the so called "sensitized" sheep red cells. As the sensitizing of sheep cells consisted in combining them with cattle antibodies (globulins), these cells egglutinated under the

influence of anti-cattle-globulin antibodies. Another component, namely the serum of a rabbit immunized with cattle-serum protein was the source of antibodies against cattle globulins.

The basic test consisted in adding suitable diluted serum of cattle, wisent and other animals to the rabbit anti-cattle serum. If some reaction occurred between the protein in the tested sera and the antibodies in rabbit serum, a part or the whole of the rabbit-serum antibodies were n e u t r a l i z e d during the reaction. By subsequently adding sensitized sheep blood cells to the mixture of investigated fluid and rabbit serum, the strenght of non-neutralized antibodies against cattle globulins was measured.

The date of Table 1 indicate that cattle serum (in the given case a homologous antigen) diluted up to 1:50 inclusively completely neutralizes antibodies against cattle globulins and, in consequence, inhibits entirely the agglutination of sensitized red cells. The neutralizing power of wisent serum is lesser — in 1:10 and 1:50 solutions it neutralizes only strongly diluted (1:160) antibodies against cattle globulins. This difference is the measure of serologic differences between the serum globulin of the two tested species of animals.

For comparison, the sera of other species of ruminants (red deer, *Cervus elaphus* L i n n a e u s, 1758, sheep), and of a horse of a pig and a wild boar, *Sus scrofa* L i n n a e us, 1758 were also tested. Red deer serum exercises some slight neutralizing effect, while no such effect appears in the sera of sheep, horse, wild boar and pig (Table 1).

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STRESZCZENIE

Wyniki doświadczenia, przedstawione w niniejszym doniesieniu stanowią jeden z elementów badań nad pokrewieństwem antygenowym gamma-globulin surowicy żubra i bydła domowego. Przeprowadzone doświadczenie polegało na zbadaniu krzyżowych reakcji odpornościowej surowicy przeciw globulinom bydła z globulinami surowicy żubra. W ogólnym schemacie dany układ doświadczenia oparto na metodzie opisanej przez A l l i s o n a & M o r t o n a (1953).

Odpornościowa surowica przeciw globulinom surowicy bydła była neutralizowana poszczególnymi surowicami (bydła, żubra, jelenia, owcy, konia, dzika i świni domowej) w różnych rozcieńczeniach. Do neutralizowanej surowicy odpornościowej dodawane były owcze krwinki czerwone, uczulone bydlęcą surowicą odpornościową dla krwinek owcy. O stopniu neutralizacji siły odpornościowej surowicy anty-globulinom bydła świadczyło miano tej surowicy w reakcji z uczulonymi erytrocytami owcy, porównywane z mianem przed neutralizacją. Z przedstawionych (Tabela 1) danych wynika, że między siłą neutralizacyjną surowicy żubra i surowicy bydła wystąpiła pewna różnica, która jest miernikiem różnic serologicznych między globulinami tych dwóch badanych gatunków zwierząt.

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