

FREE AMINO ACIDS
IN BODY MUSCLES OF SOME MINNOWS
(PISCES, CYPRINIDAE)

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In following the presence of free amino acids in m. rectus dorsalis of nine species of cyprinid fish by the method of two-dimensional ascending paper chromatography, the authors found a strictly specific incidence of these acids in the individual species, together with certain similarities within the subfamilies.

Paper chromatography of metabolic substances is being applied more and more frequently as an auxiliary method in the study of the systematics, eventually of the phylogenetic affinity of fishes. Hence, this method may be conveniently employed in the case of cyprinid fishes whose systematics has so far been based mainly on characteristics of external morphology.

Materials and methods

A segment of m. rectus dorsalis from the left side of the body (directly above septum horizontale, vertically below the insertion of the dorsal fin) was removed from nine species of cyprinid fishes (*Vimba vimba*, *Abramis brama*, *Blicca bjoerkna*, *Abramis ballerus*, *Leuciscus idus*, *Aspius aspius*, *Rutilus rutilus*, *Chondrostoma nasus* and *Barbus barbus*), caught in the Danube at Kravany on October 20th 1972. A male was available from each of these species except that of the *Blicca bjoerkna* from which there were three females. All the specimens were sexually mature. All the muscles specimens were processed by the method of two-dimensional ascending paper chromatography (for procedure see Veselovský, 1971). For the mobile phases we made use of propanol after distillation and dilution with distilled water in the ratio of 3:1 and buffered phenol. The detection was made with ninhydrin over evaporations of concentrated sulphuric acid (at $18 \pm 1^\circ\text{C}$, no longer than 24 hrs).

Results and discussion

In the species studied we found the presence of 17 ninhydrin-positive free amino acids (tab. 1).

Table 1

	Leucine+Isoleucine	Alanine	Threonine	Glycine	Serine	Glutamic acid	Aspartic acid	Methionine+Valine	Glutamine	Meth. O ₂	Tyrosine	Arginine	Proline	Lysine	X*	Asparagine	Histidine
<i>Vimba vimba</i>	+	+	+	+	+	+	+	+	+	+					+		
<i>Abramis brama</i>	+	+	+	+	+	+	+	+	+	+		+	+		+		
<i>Blicca bjoerkna</i>	+	+	+	+	+	+	+	+	+	+	+	+	+		+		
<i>Abramis ballerus</i>	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Leuciscus idus</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
<i>Aspius aspius</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
<i>Rutilus rutilus</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
<i>Chondrostoma nasus</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	
<i>Barbus barbus</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+			+

* A ninhydrin-positive amino acid not identified as yet.

As evident from the table, the incidence of free amino acids in the muscle of the species studied here is species specific. It should be noted that the same free amino acids were found in the three specimens of the species *Blicca bjoerkna*.

As regards the number of free amino acids occurring in common, there is a certain relationship among morphologically close species — *Abramis brama*, *Blicca bjoerkna*, *Abramis ballerus* and even *Leuciscus idus*. As against this, we found histidine present only in *Barbus barbus* which belongs to the subfamily of *Barbinae*, further, asparagine only in *Chondrostoma nasus*, assigned by certain authors to the subfamily of *Chondrostominae* (Hensel, 1970).

References

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VOĽNÉ AMÍNOKYSELINY SVALSTVA TRUPU NIFKTORÝCH KAPROVITÝCH RÝB (PISCES, CYPRINIDAE)

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Autori sledovali výskyt voľných aminokyselín v m. rectus dorsalis deviatich druhov kaprovitých rýb metódou bidimenzionálnej vzostupnej papierovej chromatografie. Zistili prísne druhovo špe-

cifický výskyt voľných aminokyselín pri jednotlivých druhoch, ako aj isté podobnosti v rámci podčeladi.

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СВОБОДНЫЕ АМИНОКИСЛОТЫ В МЫШЦАХ ТЕЛА НЕКОТОРЫХ КАРПОВИДНЫХ РЫБ (PISCES, CYPRINIDAE)

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Авторы наблюдали нахождение свободных аминокислот в м. ректус дорзалис у девяти видов карповидных рыб методом бидимензиональной восходящей бумажной хроматографии. Обнаружили строго видовое специфическое наличие свободных аминокислот у отдельных видов, а так же и известные сходства в рамке подсемейств.