

Hexadactyly case at a *Rana kl. esculenta* sample from the north-western part of Romania

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Abstract. At 17 June 2006, in a habitat close to Gherța Mică locality (47°56'0" N, 23°14'0" E, Satu-Mare County, Romania) we had found a sample of *Rana kl. esculenta* which presented hexadactyly at both of its posterior feet. The captured sample of edible frog had fully formed extra (sixth) toes, with phalanges (bones). The hexadactyly was perfectly symmetrical at both of the posterior feet. At this individual we did not discovered any other malformations, the biometrical characters situating in the variations limits of the other green frogs from the studied habitat. A symmetric hexadactyly can be a result of atavism.

Keywords: *Rana kl. esculenta*, hind limb, symmetric, hexadactyly

Since 1995 herpetologists have paying more attention to the phenomenon of malformations' and anomalies' occurrence at amphibians. Today's reports are coming from all countries of the world to the North American Reporting Center for Amphibian Malformations (NARCAM 2006). Scientific publications which relate malformation cases at amphibians are known since 1920 (Hovelacque 1920, see in: McCallum 1999). After 1995, when in Minnesota (USA) (see in: Meteyer 2000) there was discovered a large number of frogs with malformations, the number of scientific papers dealing with this subject had raised significantly (e.g. Kaiser 1997, Meteyer et al. 2000, Johnson et al., 2001; about Romanian amphibian populations see e.g. Szekely & Nemes 2003, Nemes 2005). At amphibians, malformations and anomalies may appear due to errors in early development (e.g. Meteyer 2000), infections (e.g. see in: Johnson et al. 2006) or due to traumas caused by predators (e.g. Nemes 2002) or human activity (e.g. cut hand, foot see in: Sas et al. 2005).

At 17 June 2006, in a habitat close to Gherța Mică locality (47°56'0" N, 23°14'0" E, Satu-Mare County, Romania) we had found a sample of *Rana kl. esculenta* which presented hexadactyly at both of its posterior feet. The provenance habitat of the mentioned frog is an approximate 2 km long channel at the edge of a forest. This habitat is used as a breeding site by many species of amphibians (*Triturus vulgaris*, *Triturus cristatus*, *Rana lessonae*, *Rana esculenta*, *Rana dalmatina*). Frogs belonging to the *Rana esculenta* complex were captured from all the lengthiness of the habitat in several outcomes. However, we identified only a single individual with such anomaly. The captured sample of edible frog had fully formed extra (sixth) toes, with phalanges (bones). The hexadactyly was perfectly symmetrical at both of the posterior feet. At this individual we did not discovered any other malformations, the biometrical characters situating in the variations limits of the other green frogs from the studied habitat (Sas – unpublished data).

Cases of polydactyly were observed at many species of amphibians (e.g. Dubois 1979, Vorobyeva 1999, Lada 1999). Even in Romania there is a remark of

polydactyly at a frog from the *Rana esculenta* complex (Andrei 1985). In the polydactyly cases the extra digit can be rudimentary, or fully formed. In our case, the collected *Rana kl. esculenta* sample, had a fully formed extra (sixth) toes, with phalanges (bones). After the specialty literature, abnormalities are usually unilateral, and when bilateral, asymmetrical (see in: Johnson et al. 2001). It is an important fact, that in our case the hexadactyly was a symmetrical one. Amphibians have no drastically modified hand and foot bones, have a high variability in the number of hand and foot bones, and probably show polydactyly (Galis et al. 2001). It is now well know that early tetrapods had more than five digits. On the basis of developmental data, that the ancestral condition of the tetrapod hand was at least seven digits, including the usual five digits, prepollex/prephallux and the postminimus; especially the digits of the extinct amphibians with up to eight digits (see in Galis et al. 2001). In this manner a symmetric hexadactyly can be a result of atavism.

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Aspecte cu privire la capacitatea de reglare a gluconeogenezei hepatice în ficatul perfuzat de șobolan

Aspects regarding the capacity of gluconeogenesis regulation of the rat perfused liver

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Abstract. The liver, also known as „the living laboratory of the organism”, is a vital organ, fulfilling a variety of functions, such as gluconeogenesis, which is glucose biosynthesis starting from non-glycidic precursors such as: lactate, fatty acids, glycerol and amino acids, an extremely important biochemical process for the animal organism especially under starvation conditions, intense activity or/and pathological states (Pașca C., Kis E. 1999).

By combining the liver perfusion technique and electronic microscopy techniques, we have been able to show that the liver can synthesize the necessary glucose even under starvation conditions, from the lactate-piruvate mixture that has been perfused (Mokuda and Sakamoto 1997; Parrila and colab. 2003; Ross and colab. 1976; Sumida and colab. 1993; Sumida and colab. 2006). We have also highlighted the CCCP(carbonil-cianid-m-clorofenylhidrazon) effect on the gluconeogenesis process, at two different final concentrations :2 μmols and 50 μmols in the Krebs-Ringer serum.

The CCCP declutches the oxydative phosphorylation, making the proton gradient fade; if the concentration is low – 2 μmols – the effect lasts in time, and at high concentration – 50 μmols – it has an irreversible inhibiting effect on the gluconeogenesis.

Cuvinte cheie: gluconeogeneză, precursori neglucidici, CCCP, lactat-piruvat, inaniție.

Keywords: gluconeogenesis, non-glycidic precursors, CCCP, lactate-piruvate mixture, starvation conditions.

In order to demonstrate the possibility of the liver to synthesize glucose we using the liver perfusion technique (Déry F., Burelle Y., Bélanger P., Gascon-Barré, Marielle and Lavoie J. M. 2001) experiments were undertaken on rats weighing 100-300 g, put to starvation for 48 hours, but with free acces to water.

The perfusion device is based on a Wolkoff's et. colab. (Wolkoff A. W., Johansen K. L. and Goeser T. 1978) device, but has been adapted to our study, the main change being the way of keeping steady the flow in the cannula, using a peristaltic pump, not letting it drop.

The liver perfusion technique appears to have an important advantage, that is the fact that it mostly assures the necessary physiological conditions, which can be found within the living animal (Wolkoff și colab. 1978). After the preparation of the Krebs-Ringer serum, the cannulation will be fulfilled by following these particular steps:

Also, we using the glucose dosage method (Changani K. K., Jalan R., Cox I. J., Ala-Korpela M., Bhakoo K. S., Taylor-Robinson S. D. and Bell J. D. 2001) This method is specific for glucose as the glucosidase only oxydates the glucose.

In order to demonstrate the possibility of the liver to synthesize glucose the liver was provided with a lactate mixture, with a final concentration of 2 mM in the Krebs serum, as well as piruvate with a 0.1 mM final concentration in the Krebs serum.

After the lactate and piruvate injection, the liver immediately begins the glucose synthesis, reaching a medium concentration of 70μmols/hour/100g body weight. By interrupting the precursors supply a rapid decrease of glucose synthesis is detected.

As a conclusion, we can say that under starvation conditions the liver is able to supply the organism with the necessary glucose.

After the 2μmols CCCP is introduced a rapid decrease of the gluconeogenesis can be observed, until