***Research Topics studied in the Institute of Physiology (Czech Academy of Sciences)***

***1954 - 2024***

**Critical periods of development, perinatal programming, late effects of early interventions  
(1954-2024) Hahn, Křeček, Koldovský, Houštěk, Kopecký**

Hahn P, Křeček J, Křečková J. The development of thermoregulation. I. The development of thermoregulatory mechanisms in young rats. *Physiol Bohemoslov* 1956;5:283-290. 39 citations

Nováková V, Faltin J, Flandera V, Hahn P, Koldovský O. Effect of early and late weaning on learning in adult rats. *Nature* 1962;193:280. 32 citations

## Kraus M, Křeček J, Popp M. Development of corticosterone production by adrenal gland in normally and prematurely weaned rats. *Physiol Bohemoslov* 1967;16: 120-127. 30 citations

Hahn P, Koldovsky O. Development of metabolic processes and their adaptation during postnatal life. In: *Physiology and Pathology of Adaptation Mechanisms*, ed. E. Bajusz, Pergamon Press, 1969, pp. 48-74. 20 citations

Křeček J. The theory of critical developmental periods and post-natal development of endocrine functions. In: *The Biopsychology of Development*, eds E. Tobach et al., Academic Press, New York, 1971, pp. 233-248. 39 citations

\*Hahn P, Kirby L. Immediate and late effects of premature weaning and of feeding a high fat or high carbohydrate diet to weanling rats. *J Nutr* 1973;103: 690-696. 92 citations

\*Coates PM, Brown SA, Sonawane BR, Koldovsky O. Effect of early nutrition on serum cholesterol levels in adult rats challenged with high fat diet. *J Nutr* 1983;113:1046-1050. 31 citations

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5'-deiodinase and uncoupling protein in brown adipose tissue of human newborns. *J Clin Endocrinol Metab* 1993;77:382-387. 67 citations

Pavelka S, Kopecký P, Bendlová B, Štolba P, Vítková I, Vobruba V, Plavka R, Houštěk J, Kopecký J. Tissue metabolism and plasma levels of thyroid hormones in critically ill very premature infants. *Pediatr Res* 1997;42:812-818. 45 citations

Kus V, Prazak T, Brauner P, Hensler M, Kuda O, Flachs P, Janovska P, Medrikova D, Rossmeisl M, Jilkova Z, Stefl B, Pastalkova E, Drahota Z, Houstek J, Kopecky J. Induction of muscle thermogenesis by high-fat diet in mice: association with obesity-resistance. *Am J Physiol Endocrinol Metab* 2008;295:E356-E367. 62 citations

**Muscle physiology (1954-1979)** **Gutmann, Hanzlíková, Hník, Bass, Syrový**

Hník P, Jirmanová I, Vyklický L, Zelená J. Fast and slow muscles of the chick after nerve cross-union. *J Physiol* 1967;193:309-325. 117 citations

Syrový I, Gutmann E. Changes in speed of contraction and ATPase activity in striated muscle during old age. *Exp Gerontol* 1970;5:31-35. 60 citations

Gutmann E, Hanzlíková V, Vyskočil F. Age changes in cross striated muscle of the rat. *J Physiol* 1971;216:331-343. 126 citations

Gutmann E, Schiaffino S, Hanzliková V. Mechanism of compensatory hypertrophy in skeletal muscle of the rat. *Exp Neurol* 1971;31:451-464. 165 citations

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Bass A, Gutmann E, Hanzlíková V. Biochemical and histochemical changes in energy supply enzyme pattern of muscles of the rat during old age. *Gerontologia* 1975;21:31-45. 106 citations

Gutmann E, Carlson BM. Contractile and histochemical properties of regenerating cross-transplanted fast and slow muscles in the rat. *Pflügers Arch* 1975;353:227-239. 61 citations

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**Neurotrophic effects in skeletal muscle (1954-1993) Gutmann, Žák, Vrbová, Beránek, Hník, Syrový, Vejsada, Paleček**

Žák R, Gutmann E, Vrbová G. Quantitative changes of muscle proteins after stimulation of the muscle. *Experientia* 1957;13:80-81. 9 citations

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Žák R, Gutmann E. Lack of correlation between synthesis of nucleic acids and proteins in denervated muscle. *Nature* 1960;185:766-767. 14 citations

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Gutmann E, Sandow A. Caffeine-induced contracture and potentiation of contraction in normal and denervated rat muscle. *Life Sci* 1965;4:1149-1156. 85 citations

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Vejsada R, Hník P, Navarrete R, Paleček J, Soukup T, Borecka U, Payne R. Motor functions in rat hindlimb muscles following neonatal sciatic nerve crush. *Neuroscience* 1991;40:267-275. 32 citations

\*Vejsada R, Sagot Y, Kato AC. Quantitative comparison of the transient rescue effects of neurotrophic factors on axotomized motoneurons in vivo. *Eur J Neurosci* 1995;7:1081-1015. 139 citations

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**Mechanoreceptors development, morphology and function (1954-2016) Zelená, Hník, Hudlická, Jirmanová, Soukup, Vejsada**

Zelena J. The morphogenetic influence of innervation on the ontogenetic development of muscle spindles. *J Embryol Exp Morphol* 1957;5:283-292. 193 citations

Zelená J. Development, degeneration and regeneration of receptor organs. *Prog Brain Res* 1964;13:175-213. 130 citations

Zelená J, Lubińska L, Gutmann E. Accumulation of organelles at the ends of interrupted axons. *Z Zellforsch Mikrosk Anat* 1968;91:200-219. 184 citations

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Jirmanová I, Thesleff S. Ultrastructural study of experimental muscle degeneration and regeneration in the adult rat. *Z Zellforsch Mikrosk Anat* 1972;131:77-97. 144 citations

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Hník P, Vejsada R, Goldspink DF, Kasicki S, Krekule I. Quantitative evaluation of electromyogram activity in rat extensor and flexor muscles immobilized at different lengths. *Exp Neurol* 1985;88:515-528. 75 citations

Soukup T, Pedrosa F, Thornell LE. Influence of neonatal motor denervation on expression of myosin heavy chain isoforms in rat muscle spindles. *Histochemistry* 1990;94: 245-256. 36 citations

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**Spreading depression (1954-1999) Bureš, Burešová, Křivánek**

Bureš J, Burešová O. The use of Leao spreading depression in the study of interhemispheric transfer of memory traces. *J Comp Physiol Psychol* 1960;53: 558-563. 81 citations

Křivánek J. Some metabolic changes accompanying Leao's spreading cortical depression in the rat. *J Neurochem* 1961;6:183-189. 84 citations

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**Water and electrolyte metabolism, body fluids, ion transport (1954-2021) Křeček, Jelínek, Dlouhá, Kuneš, Zicha**

Čapek K, Jelínek J. The development of the control of water metabolism. I. The excretion of urine in young rats. *Physiol Bohemoslov* 1956;5:91-96. 56 citations

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Křeček J, Nováková V, Stibral K. Sex differences in the taste preference for a salt solution in the rat. *Physiol Behav* 1972;8:183-188. 76 citations

Dlouhá H, Křeček J, Zicha J. Postnatal development and diabetes insipidus in Brattleboro rats. *Ann N Y Acad Sci* 1982;394:10-20. 42 citations

Kuneš J, Štolba P, Pohlová I, Jelínek J, Zicha J. The importance of endogenous digoxin-like factors in rats with various forms of experimental hypertension. *Clin Exp Hypertens A* 1985;7:707-720. 34 citations

Zicha J, Duhm J. Kinetics of Na+ and K+ transport in red blood cells of Dahl rats. Effects of age and salt. *Hypertension* 1990;15:612-627. 49 citations

Zicha J, Negrin CD, Dobešová Z, Carr F, Vokurková M, McBride MW, Kuneš J, Dominiczak AF. Altered   
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**Toxic effects of mercury and cadmium (1956-1976) Pařízek**

Pařízek J, Záhoř Z. Effect of cadmium salts on testicular tissue. *Nature* 1956;177:1036. 342 citations

Pařízek J. The destructive effect of cadmium ion on testicular tissue and its prevention by zinc. *J Endocrinol* 1957;15:56-63. 408 citations

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**Clinical and translational epileptology (1958-2024) Servít, Mareš P, Jiruška**

Servit Z. Prophylactic treatment of post-traumatic audiogenic epilepsy. *Nature* 1960;188:669-670. 17 citations

## Servit Z, Machek J, Štercová A, Dudáš D, Krištof M, Červenková V. Reflex influences in the pathogenesis of epilepsy in the light of clinical statistics. *Epilepsia* 3: 315-322, 1962. 24 citations

Hrbek A, Mareš P. Cortical evoked responses to visual stimulation in full-term and premature newborns. *Electroenceph Clin Neurophysiol* 1964;16:575-581. 86 citations

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Jiruska P, de Curtis M, Jefferys JG, Schevon CA, Schiff SJ, Schindler K. Synchronization and desynchronization in epilepsy: controversies and hypotheses. *J Physiol* 2013;591:787-797. 379 citations

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**Higher brain functions (1958-2000) Radil, Bohdanecký, Indra, Mates**

Lánský P, Radil T. Statistical inference on spontaneous neuronal discharge patterns. I. Single neuron. *Biol Cybern* 1987;55:299-311. 33 citations

Paus T, Babenko V, Radil T. Development of an ability to maintain verbally instructed central gaze fixation studied in 8- to 10-year-old children. *Int J Psychophysiol* 1990;10:53-61. 32 citations

Franĕk M, Mates J, Radil T, Beck K, Pöppel E. Finger tapping in musicians and nonmusicians. *Int J Psychophysiol* 1991;11:277-279. 44 citations

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**Lipid metabolism – cholesterol transport (1959-2011) Hahn, Koldovský, Dobiášová**

Drahota Z, P Hahn P, Kleinzeller A, Kostolánská A: Acetoacetate formation by liver slices from adult and infant rats. *Biochem J* 1964; 93:61-65. 73 citations

Dobiasova M, Hahn P, Koldovsky O. Fatty acid composition in developing rats. Fatty acid composition of triglycerides and phospholipids in some organs of the rat during postnatal development. *Biochim Biophys Acta* 1964;84:538-549. 46 citations

## \*Hahn P, Koldovsky O. Late effect of premature weaning on blood cholesterol levels in adult rats. *Nutr Rep Int* 1976;13: 87-91. 41 citations

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**Ontogeny of animal behavior (1959-1987) Lát J, Nováková V, Martínek Z**

Nováková V, Faltin J, Flandera V, Hahn P, Koldovský O. Effect of early and late weaning on learning in adult rats. *Nature* 1962;193:280. 32 citations

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## Nováková V. Role of mother during suckling period of newborn rats on subsequent adult learning. *Physiol Behav* 1966;1: 219-221. 20 citations

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**Epilepsy and brain metabolism (1960-2024) Folbergrová, Kubová, Otáhal**

Folbergrová J, Passonneau JV, Lowry OH, Schulz DW. Glycogen, ammonia and related metabolities in the brain during seizures evoked by methionine sulphoximine*. J Neurochem* 1969;16:191-203. 255 citations

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**Cardiac development and sensitivity to hypoxia (1963-2024) Poupa, Ošťádal, Kolář, Ošťádalová**

Rakušan K, Poupa O. Changes in the diffusion distance in the rat heart muscle during development. *Physiol Bohemoslov* 1963;12:220-227. 56 citations

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Ošťádalová I, Kolář F, Ošťádal B, Rohlíček V, Rohlíček J, Procházka J. Early postnatal development of contractile performance and responsiveness to Ca2+, verapamil and ryanodine in the isolated rat heart. *J Mol Cell Cardiol* 1993;25:733-740. 47 citations

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**Mitochondrial calcium metabolism and glycerol-3-phosphate dehydrogenase (1963-2020)**

**Drahota, Houštěk, Mráček**

Drahota Z, Carafoli E, Rossi CS, Gamble RL, Lehninger AL. Steady state maintenance of accumulated Ca++ in rat liver mitochondria. *J Biol Chem* 1965;240:12-20. 226 citations

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Mráček T, Holzerová E, Drahota Z, Kovářová N, Vrbacký M, Ješina P, Houštěk J. ROS generation and multiple forms of mammalian mitochondrial glycerol-3-phosphate dehydrogenase *Biochim Biophys Acta Bioenerg* 2014;1837:98-111. 52 citations

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**Neurocytology (1963-2012) Lodin, Mareš V**

Mareš V, Lodin Z. The cellular kinetics of the developing mouse cerebellum. II. The function of the external granular layer in the process of gyrification. *Brain Res* 1970;23:343-352. 101 citations

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**Cell cultures (1964-2016) Holečková, Michl, Baudyšová, Tolar, Mareš V**

Soukupová M, Holečková E. The latent period of explanted organs of newborn, adult and senile rats. *Exp Cell Res* 1964;33:361-367. 50 citations

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**Acetylcholine receptors at neuromuscular junction (1965-1998) Beránek, Vyskočil**

Beránek R, Vyskočil F. The action of tubocurarine and atropine on the normal and denervated rat diaphragm. *J Physiol* 1967;188:53-66. 192 citations

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