

## Jiří Hejnar

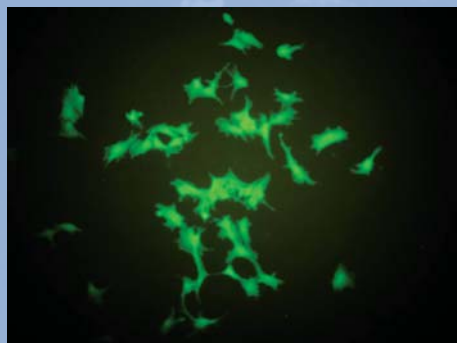
hejnar@img.cas.cz

### Laboratory of Viral and Cellular Genetics

Receptors for retroviruses, retroviral vectors, endogenous retroviruses



Jiří Hejnar, PhD / Head of Laboratory  
 Jana Blažková, PhD / Research Scientist  
 Josef Geryk, PhD / Research Scientist  
 Jiří Plachý, PhD / Research Scientist  
 Jan Svoboda, Prof., DSc / Research Scientist  
 Kateřina Trejbalová, PhD / Research Scientist  
 Věra Hoserová, MSc / Research Assistant  
 Dana Kučerová, MSc / Research Assistant  
 Markéta Reinišová, MSc / Research Assistant  
 Jitka Dvořáková / Technician  
 Lenka Mikušová / Technician  
 Kamilla Thunová / Technician  
 Magda Matoušková, MSc / PhD Student  
 Dana Průková, MSc / PhD Student  
 Volodymyr Stepanets, MSc / PhD Student  
 Filip Šenigl, MSc / PhD Student  
 Miroslav Auxt / Diploma Student  
 Petr Daniel / Diploma Student  
 Jan Kotáb / Diploma Student  
 Denisa Kovářová / Diploma Student  
 Anton A Buzdin / Visiting Scientist



Retroviral vector transduces GFP reporter gene into chicken testicular cells including the spermatogonial stem cells

## Research topics

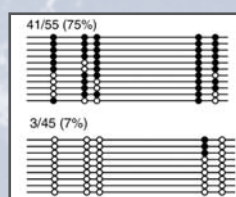
The main scientific interest of our group has been traditionally focused on the interactions of retroviruses with the host cells. Retroviruses enter their natural host cells via specific receptors, integrate into the host genome, and use the cell transcription machinery to express their structural or enzymatically active proteins. At the level of whole organism, retroviruses induce various pathologies and may even penetrate the germ lines being thereafter transmitted vertically as endogenous retroviruses. Human endogenous retroviruses do not replicate themselves but some of them are inevitable for our health and some of them may be harmful by inadvertent activation. Host cells inactivate the integrated invaders by their transcriptional silencing via DNA methylation and modifications of adjacent histones. This is, however, an obstacle in using retroviruses as vectors for gene transfer and transgenesis. In the years 2006 and 2007, we have identified a novel semiresistant variant of chicken receptor for ASLV-B and described the ASLV-induced wasting disease in chicken. We have described that insertion of a core element from CpG island into retroviral vectors improves their resistance to transcriptional silencing and ensures long-term expression of such vectors. We have successfully used a retroviral vector for transduction of reporter genes in chicken male germ line, which opens the way to efficient transgenesis in chicken. We have also characterized the CpG methylation patterns of human syncytins, endogenous retroviruses involved in differentiation of human placenta syncytiotrophoblast. Furthermore, we are interested in porcine endogenous retroviruses as a potential risk factor in xenotransplantation of pig organs and tissues.

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### Selected recent papers

1. Matoušková M, Blažková J, Pajer P, Pavlíček A, Hejnar J. CpG methylation suppresses transcriptional activity of human syncytin-1 in non-placental tissues. **Exp Cell Res.** 2006;312:1011-1020.
2. Průková D, Vernerová Z, Pilčík T, Stepanets V, Indrová M, Geryk J, Plachý J, Hejnar J, Svoboda J. Differences in pathogenicity among ALV strains belonging to the same subgroup. **Avian Pathol.** 2007;36:15-27.
3. Kalina J, Šenigl F, Mičáková A, Mucksová J, Blažková J, Poplštejn M, Hejnar J, Trefil P. Retrovirus-mediated in vitro gene transfer into chicken male germ line cells. **Reproduction.** 2007;134:445-453.
4. Reinišová M, Šenigl F, Yin X, Plachý J, Geryk J, Elleder D, Svoboda J, Federspiel MJ, Hejnar J. A single amino acid substitution in the TvbS1 receptor results in the semi-resistant phenotype of an inbred chicken line to infection by subgroup B and D avian sarcoma and leukosis viruses. **J Virol**; in press.



Comparison of the CpG methylation within syncytin-1 LTR in HeLa (upper part) and BeWo (lower part) cells