

Quantification of Cell Turnover in the Bovine Leukemia Virus Model

Human T-Lymphotropic Viruses pp 173-182 | Cite as

- Alix de Brogniez (1)
- Pierre-Yves Barez (1)
- Alexandre Carpentier (1)
- Geronimo Gutierrez (2)
- Michal Reichert (3)
- Karina Trono (2)
- Luc Willems (1) Email author (Luc.willems@ulg.ac.be)

1. Molecular Biology (GxABT) and Molecular and Cellular Epigenetics (GIGA), University of Liege, , Gembloux and Liege, Belgium

2. Instituto de Virología, Centro de Investigaciones en Ciencias Veterinarias y Agronómicas, INTA, , Castelar, Argentina

3. Department of Pathology, National Veterinary Research Institute, , Pulawy, Poland

Protocol

First Online: 30 March 2017

- [1 Readers](#)
- [513 Downloads](#)

Part of the [Methods in Molecular Biology](#) book series (MIMB, volume 1582)

Abstract

In a perspective of a comparative virology approach, characterization of the bovine leukemia virus (BLV) model may be helpful to better understand infection by the related human T-lymphotropic virus type 1 (HTLV-1). In this paper, we first provide detailed protocols to inoculate cloned BLV proviruses into sheep or cattle. We also describe methods to quantify apoptosis ex vivo and cell turnover in vivo.

Key words

Deltaretrovirus Bovine leukemia virus HTLV-1 Apoptosis Proliferation CFDA-SE

This is a preview of subscription content, [log in](#) to check access.

References

1. Rodríguez SM, Florins A, Gillet N, de Brogniez A, Sánchez-Alcaraz MT, Boxus M, Boulanger F, Gutiérrez G, Trono K, Alvarez I, Vagnoni L, Willems L (2011)

Preventive and therapeutic strategies for bovine leukemia virus: lessons for HTLV. *Viruses* 3(7):1210–1248

[CrossRef](https://doi.org/10.3390/v3071210) (https://doi.org/10.3390/v3071210)

[PubMed](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=21994777) (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=21994777)

[PubMedCentral](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3185795) (http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3185795)

[Google Scholar](http://scholar.google.com/scholar_lookup?title=Preventive%20and%20therapeutic%20strategies%20for%20bovine%20leukemia%20virus%3A%20lessons%20for%20HTLV&author=SM.%20Rodr%C3%ADguez&author=A.%20Florins&author=N.%20Gillet&author=A.%20Brogniez&author=MT.%20S%C3%A1nchez-Alcaraz&author=M.%20Boxus&author=F.%20Boulanger&author=G.%20Guti%C3%A9rrez&author=K.%20Trono&author=I.%20Alvarez&author=L.%20Vagnoni&author=L.%20Willems&journal=Viruses&volume=3&issue=7&pages=1210-1248&publication_year=2011) (http://scholar.google.com/scholar_lookup?title=Preventive%20and%20therapeutic%20strategies%20for%20bovine%20leukemia%20virus%3A%20lessons%20for%20HTLV&author=SM.%20Rodr%C3%ADguez&author=A.%20Florins&author=N.%20Gillet&author=A.%20Brogniez&author=MT.%20S%C3%A1nchez-Alcaraz&author=M.%20Boxus&author=F.%20Boulanger&author=G.%20Guti%C3%A9rrez&author=K.%20Trono&author=I.%20Alvarez&author=L.%20Vagnoni&author=L.%20Willems&journal=Viruses&volume=3&issue=7&pages=1210-1248&publication_year=2011)

2. Gillet N, Florins A, Boxus M, Burteau C, Nigro A, Vandermeers F, Balon H, Bouzar A-B, Defoiche J, Burny A, Reichert M, Kettmann R, Willems L (2007) Mechanisms of leukemogenesis induced by bovine leukemia virus: prospects for novel anti-retroviral therapies in human. *Retrovirology* 4:18

[CrossRef](https://doi.org/10.1186/1742-4690-4-18) (https://doi.org/10.1186/1742-4690-4-18)

[PubMed](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=17362524) (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=17362524)

[PubMedCentral](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1839114) (http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1839114)

[Google Scholar](http://scholar.google.com/scholar_lookup?title=Mechanisms%20of%20leukemogenesis%20induced%20by%20bovine%20leukemia%20virus%3A%20prospects%20for%20novel%20anti-retroviral%20therapies%20in%20human&author=N.%20Gillet&author=A.%20Florins&author=M.%20Boxus&author=C.%20Burteau&author=A.%20Nigro&author=F.%20Vandermeers&author=H.%20Balon&author=A-B.%20Bouzar&author=J.%20Defoiche&author=A.%20Burny&author=M.%20Reichert&author=R.%20Kettmann&author=L.%20Willems&journal=Retrovirology&volume=4&pages=18&publication_year=2007) (http://scholar.google.com/scholar_lookup?title=Mechanisms%20of%20leukemogenesis%20induced%20by%20bovine%20leukemia%20virus%3A%20prospects%20for%20novel%20anti-retroviral%20therapies%20in%20human&author=N.%20Gillet&author=A.%20Florins&author=M.%20Boxus&author=C.%20Burteau&author=A.%20Nigro&author=F.%20Vandermeers&author=H.%20Balon&author=A-B.%20Bouzar&author=J.%20Defoiche&author=A.%20Burny&author=M.%20Reichert&author=R.%20Kettmann&author=L.%20Willems&journal=Retrovirology&volume=4&pages=18&publication_year=2007)

3. Gutiérrez G, Rodríguez SM, De Brogniez A, Gillet N, Golime R, Burny A, Jaworski JP, Alvarez I, Vagnoni L, Trono K, Willems L (2014) Vaccination against δ -retroviruses: the bovine leukemia virus paradigm. *Viruses* 6(6):2416–2427

[CrossRef](https://doi.org/10.3390/v6062416) (https://doi.org/10.3390/v6062416)

[PubMed](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=24956179) (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=24956179)

[PubMedCentral](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4074934) (http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4074934)

[Google Scholar](http://scholar.google.com/scholar_lookup?title=Vaccination%20against%20%CE%B4-retroviruses%3A%20the%20bovine%20leukemia%20virus%20paradigm&author=G.%20Guti%C3%A9rrez&author=SM.%20Rodr%C3%ADguez&author=A.%20De%20Brogniez&author=N.%20Gillet&author=R.%20Golime&author=A.%20Burny&author=JP.%20Jaworski&author=I.%20Alvarez&author=L.%20Vagnoni&author=K.%20Trono&author=L.%20Willems&journal=Viruses&volume=6&issue=6&pages=2416-2427&publication_year=2014) (http://scholar.google.com/scholar_lookup?title=Vaccination%20against%20%CE%B4-retroviruses%3A%20the%20bovine%20leukemia%20virus%20paradigm&author=G.%20Guti%C3%A9rrez&author=SM.%20Rodr%C3%ADguez&author=A.%20De%20Brogniez&author=N.%20Gillet&author=R.%20Golime&author=A.%20Burny&author=JP.%20Jaworski&author=I.%20Alvarez&author=L.%20Vagnoni&author=K.%20Trono&author=L.%20Willems&journal=Viruses&volume=6&issue=6&pages=2416-2427&publication_year=2014)

4. Lyons AB (2000) Analysing cell division in vivo and in vitro using flow cytometric measurement of CFSE dye dilution. *J Immunol Methods* 243:147–154

[CrossRef](https://doi.org/10.1016/S0022-1759(00)00231-3) (https://doi.org/10.1016/S0022-1759(00)00231-3)

PubMed (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=10986412)

Google Scholar (http://scholar.google.com/scholar_lookup?title=Analysing%20cell%20division%20in%20vivo%20and%20in%20vitro%20using%20flow%20cytometric%20measurement%20of%20CFSE%20dye%20dilution&author=AB.%20Lyons&journal=J%20Immunol%20Methods&volume=243&pages=147-154&publication_year=2000)

5. Ristevski B (2003) Tracking dendritic cells: use of an in situ method to label all blood leukocytes. *Int Immunol* 15:159–165
CrossRef (<https://doi.org/10.1093/intimm/dxg016>)
PubMed (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=12578845)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Tracking%20dendritic%20cells%3A%20use%20of%20an%20in%20situ%20method%20to%20label%20all%20blood%20leukocytes&author=B.%20Ristevski&journal=Int%20Immunol&volume=15&pages=159-165&publication_year=2003)
6. Asquith B, Debacq C, Florins A, Gillet N, Sanchez-Alcaraz T, Mosley A, Willems L (2006) Quantifying lymphocyte kinetics in vivo using carboxyfluorescein diacetate succinimidyl ester. *Proc R Soc B Biol Sci* 273:1165–1171
CrossRef (<https://doi.org/10.1098/rspb.2005.3432>)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Quantifying%20lymphocyte%20kinetics%20in%20vivo%20using%20carboxyfluorescein%20diacetate%20succinimidyl%20ester&author=B.%20Asquith&author=C.%20Debacq&author=A.%20Florins&author=N.%20Gillet&author=T.%20Sanchez-Alcaraz&author=A.%20Mosley&author=L.%20Willems&journal=Proc%20R%20Soc%20B%20Biol%20Sci&volume=273&pages=1165-1171&publication_year=2006)
7. Willems L, Kettmann R, Dequiedt F, Portetelle D, Vonèche V, Cornil I, Kerkhofs P, Burny A, Mammerickx M (1993) In vivo infection of sheep by bovine leukemia virus mutants. *J Virol* 67:4078–4085
PubMed (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=8389918)
PubMedCentral (<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC237776>)
Google Scholar (http://scholar.google.com/scholar_lookup?title=In%20vivo%20infection%20of%20sheep%20by%20bovine%20leukemia%20virus%20mutants&author=L.%20Willems&author=R.%20Kettmann&author=F.%20Dequiedt&author=D.%20Portetelle&author=V.%20Von%C3%A8che&author=I.%20Cornil&author=P.%20Kerkhofs&author=A.%20Burny&author=M.%20Mammerickx&journal=J%20Virol&volume=67&pages=4078-4085&publication_year=1993)

Copyright information

© Springer Science+Business Media LLC 2017

About this protocol

Cite this protocol as:

de Brogniez A. et al. (2017) Quantification of Cell Turnover in the Bovine Leukemia Virus Model. In: Casoli C. (eds) Human T-Lymphotropic Viruses. Methods in Molecular Biology, vol 1582. Humana Press, New York, NY

- First Online 30 March 2017
- DOI https://doi.org/10.1007/978-1-4939-6872-5_13
- Publisher Name Humana Press, New York, NY
- Print ISBN 978-1-4939-6870-1
- Online ISBN 978-1-4939-6872-5
- eBook Packages [Springer Protocols](#)

- [Buy this book on publisher's site](#)
- [Reprints and Permissions](#)

Personalised recommendations

SPRINGER NATURE

© 2018 Springer Nature Switzerland AG. Part of [Springer Nature](#).

Not logged in Mincyt Ministerio de Ciencia (3000199976) - Instituto Nacional de Tecnología Agropecuaria (3000201862) 200.41.178.226