



Curriculum Vitae

Personal information **Eeva Auvinen**

Work experience

01/01/2002 – CURRENT – Helsinki, Finland
SENIOR LABORATORY SUPERVISOR – Helsinki University Hospital Diagnostic Center
Laboratory developed test (LDT) development, manufacture and quality assurance. Molecular diagnostics for viruses. Tumour virus diagnostics and research (polyomaviruses, papillomaviruses). Next generation sequencing (NGS) applications in laboratory diagnostics. Assessment of novel biomarkers for viral diseases. Involved in cervical cancer screening.

22/03/2018 - CURRENT - Helsinki, Finland
EXPERT, External Quality Assessment for Human Papillomavirus assays for clinical laboratories for Labquality, Helsinki, Finland

01/04/2000 – 31/12/2001 – Helsinki, Finland
UNIVERSITY RESEARCH ASSISTANT, LABORATORY SUPERVISOR – University of Helsinki
Independent research on epithelial cells, papillomaviruses. Teaching on virology courses for medical and dentistry students.

01/01/2000 – 31/03/2000 – Helsinki, Finland
RESEARCH FELLOW – Helsinki University Hospital Diagnostics
Independent research on epithelial cells, papillomaviruses. Teaching on virology courses for medical and dentistry students.

01/04/1999 – 31/12/1999 – Helsinki, Finland
RESEARCH FELLOW – University of Helsinki
Independent research on epithelial cells, papillomaviruses. Teaching on virology courses for medical and dentistry students.

01/01/1998 – 31/03/1999 – Helsinki, Finland
RESEARCH FELLOW – Helsinki University Hospital Diagnostics
Independent research on epithelial cells, papillomaviruses. Teaching on virology courses for medical and dentistry students.

01/04/1996 – 31/12/1997 – Helsinki, Finland
RESEARCH FELLOW – University of Helsinki (grant)
Independent research on epithelial cells, papillomaviruses. Teaching on virology courses for medical and dentistry students.

01/07/1993 – 31/03/1996 – Heidelberg, Germany
VISITING FELLOW (POST DOC) – Deutsches Krebsforschungszentrum (German Cancer Research Center)
Basic research on human papillomaviruses.

01/11/1992 – 30/04/1993 – Turku, Finland
POST DOCTORAL FELLOW – University of Turku
Research on human papillomaviruses.

Education and training

23/04/1993 – Turku, Finland
PHD (VIROLOGY, MOLECULAR BIOLOGY) – University of Turku

07/01/1991 – Tuomiokirkontori 3, Turku, Finland
MSC (BIOCHEMISTRY) – Åbo Akademi University

Additional information

Publications

Publications / Eeva Auvinen

Original publications

Auvinen E, Hukkanen V, Lehmijoki J, Salmi T, Arstila P. Comparison of smear specimens with biopsy specimens in a nucleic acid hybridization test for human papilloma virus (HPV) infection. *Acta Obstetr Gynecol Scand* 68:627-631, 1989.

- Auvinen E, Hukkanen V, Arstila P. Polyethylene glycol increases specificity of hybridization typing of HPV specimens. *Mol Cell Probes* 3:289-298, 1989.
- Hyypiä T, Auvinen E, Kovanen S, Ståhlberg T. Rapid quantitation of DNA spot hybridization by flatbed scintillation counting. *J Clin Microbiol* 28:159-162, 1990.
- Auvinen E, Kujari H, Arstila P, Hukkanen V. Expression of the L2 and E7 genes of the human papillomavirus type 16 in female genital dysplasias. *Am J Pathol* 141:1217-1224, 1992.
- Hietanen S, Auvinen E, Grénman S, Lakkala T, Sajantila A, Klemi P, Mäenpää J. Isolation of two keratinocyte cell lines derived from HPV-positive dysplastic vaginal lesions. *Int J Cancer* 52:391-398, 1992.
- Hukkanen V, Auvinen E, Salmi T, Virtanen M, Kujari H. A comparison of human papillomavirus detection rates by dot blot assay from smear and biopsy specimens with regard to human papillomavirus type and histologic diagnosis. *Am J Clin Pathol* 101:694-697, 1994.
- Bauer-Hofmann R, Borghouts C, Auvinen E, Bourda E, Rösl F, Alonso A. Genomic cloning and characterization of the non-occupied allele corresponding to the integration site of human papillomavirus type 16 DNA in the cervical cancer cell line SiHa. *Virology* 217:33-41, 1996.
- Crusius K, Auvinen E, Alonso A. Enhancement of EGF- and PMA-mediated MAP kinase activation in cells expressing the human papillomavirus type 16 E5 protein. *Oncogene* 15:1437-1444, 1997.
- Atula S, Auvinen E, Grénman R, Syrjänen S. Human papillomavirus and Epstein-Barr virus in epithelial carcinomas of the head and neck region. *Anticancer Res* 17:4427-4434, 1997.
- Auvinen E, Hietanen S, Gissmann L, Alonso A. Human papillomavirus type 33 DNA and E6-E7 transcripts in late passages of the UT-DEC-1 vaginal keratinocyte cell line. *Mol Cell Probes* 12:59-62, 1998.
- Crusius K, Auvinen E, Steuer B, Gaissert H, Alonso A. The human papillomavirus type 16 E5-protein modulates ligand-dependent activation of the EGF receptor family in the human epithelial cell line HaCaT. *Exp Cell Res* 241:76-83, 1998.
- Hietanen S, Auvinen E, Syrjänen K, Syrjänen S. Anti-proliferative effect of retinoids and interferon- α -2a on vaginal cell lines derived from squamous intra-epithelial neoplasia. *Int J Cancer* 78:338-345, 1998.
- Aaltonen LM, Partanen J, Auvinen E, Rihkanen H, Vaheri A. HLA-DQ alleles and human papillomavirus DNA in adult-onset laryngeal papillomatosis. *J Inf Dis* 179:682-685, 1999.
- Oetke C, Auvinen E, Pawlita M, Alonso A. Human papillomavirus type 16 E5 protein localizes to the Golgi apparatus but does not grossly affect cellular glycosylation. *Arch Virol* 145:2183-2191, 2000.

- Aaltonen LM, Auvinen E, Dillner J, Lehtinen M, Paavonen J, Rihkanen H, Vaheri A. Poor antibody response against human papillomavirus in adult-onset laryngeal papillomatosis. *J Med Microbiol* 50:468-471, 2001.
- Mattila PS, Heikkilä L, Nieminen M, Mattila S, Auvinen E, Tarkkanen J. Malignancies after heart transplantation. *Clin Transplant* 15:337-342, 2001.
- Auvinen E, Tarkkanen J, Mattila P, Mattila S. Human papillomavirus 16 in a heart transplant recipient. *Transplant Proc* 34:1281-1282, 2002.
- Koskinen W, Chen R, Leivo I, Mäkitie A, Bäck L, Kontio R, Suuronen R, Lindqvist C, Auvinen E, Molijn A, Quint W, Vaheri A, Aaltonen LM. Prevalence and physical status of human papillomavirus in squamous cell carcinomas of the head and neck. *Int J Cancer* 107:401-406, 2003.
- Auvinen E, Niemi M, Malm C, Zilliacus R, Trontti A, Fingerroos R, Lehtinen M, Paavonen J. Joka kolmannella opiskelijalla genitaalisen papilloomavirusinfektio [Every third student has a genital papillomavirus infection]. *Suomen Lääkäril* 14:1487-1489, 2004.
- Auvinen E, Alonso A, Auvinen P. Human papillomavirus type 16 E5 protein colocalizes with the antiapoptotic Bcl-2 protein. *Arch Virol* 149:1745-1759, 2004.
- Paavonen J, Trontti A, Malm C, Zilliacus R, Niemi M, Auvinen E, Meurman O, Lehtinen M. Klamydian esiintyvyys ylioppilaiden terveydenhoitosäätiön asiakkaila [Prevalence of Chlamydia trachomatis among Students' Healthcare patients]. *Suomen Lääkäril* 3:261-263, 2005.
- Auvinen E, Niemi M, Malm C, Zilliacus R, Trontti A, Fingerroos R, Lehtinen M, Paavonen J. High prevalence of HPV among female students in Finland. *Scand J Infect Dis* 37:873-876, 2005.
- Tarkkanen J, Auvinen E, Nieminen P, Malmi R, Vartiainen J, Timonen T, Laurila P, Räisänen I, Unnerus HA, Sakki A, van den Brule A, Tapper AM. HPV DNA testing as an adjunct in the management of patients with low grade cytological lesions in Finland. *Acta Obstetr Gynecol Scand* 86:367-372, 2007.
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- Auvinen E, Zilliacus R, Malm C, Karkkulainen T, Fingerroos R, Paavonen J. Repeated HPV DNA findings among female university students. *Int J of STD & AIDS*, 18:839-841, 2007.
- Kivi N, Greco D, Auvinen P, Auvinen E. Genes involved in cell adhesion, cell motility and mitogenic signaling are altered due to HPV 16 E5 protein expression. *Oncogene*, 27:2532-2541, 2008.
- Helanterä I, Ortiz F, Auvinen E, Räisänen-Sokolowski A, Lappalainen M, Lautenschlager I, Koskinen P. Polyomavirus BK and JC infections in well

matched Finnish kidney transplant recipients. *Transplant Int*, 22:688-693, 2009.

Kantola K, Sadeghi M, Ewald M, Weissbrich B, Allander T, Lindau C, Andreasson K, Lahtinen A, Kumar A, Norja P, Jartti T, Lehtinen P, Auvinen E, Ruuskanen O, Söderlund-Venermo M, Hedman K. Expression and serological characterization of polyomavirus WUPyV and KIPyV structural proteins. *Viral Immunol*, 23:385-393, 2010.

Greco D, Kivi N, Qian K, Leivonen SK, Auvinen P, Auvinen E. Human papillomavirus 16 E5 modulates the expression of host microRNAs. *PLoS ONE* 6: e21646. doi:10.1371/journal.pone.0021646, 2011.

Rahkola P, Väisänen-Tommiska M, Hiltunen-Back E, Auvinen E, Ylikorkala O, Mikkola T. Cervical nitric oxide release in *Chlamydia trachomatis* and high risk human papillomavirus infection. *Acta Obstetr Gynecol Scand*. doi: 10.1111/j.1600-0412.2011.01205.x, 2011.

Ritari J, Hultman J, Fingerroos R, Tarkkanen J, Pullat J, Paulin L, Kivi N, Auvinen P, Auvinen E. Detection of human papillomaviruses by polymerase chain reaction and ligation detection reaction on universal microarray. *PLoS ONE* 7(3): e34211. doi:10.1371/journal.pone.0034211, 2012.

Ilmarinen T, Auvinen E, Hiltunen-Back E, Ranki A, Aaltonen LM, Pitkäranta A. Transmission of human papillomavirus DNA from patient to surgical masks, gloves and oral mucosa of medical personnel during treatment of laryngeal papillomas and genital warts. *Eur Arch Otorhinolaryngol*, 269:2367-71, 2012.

Jakobsson M, Tarkkanen J, Auvinen E, Häkkinen R, Laurila P, Tapper AM. Colposcopy referral rate can be reduced by high-risk human papillomavirus triage in the management of recurrent atypical squamous cells of undetermined significance or low grade squamous intraepithelial lesion cytology in Finland. *Int J STD & AIDS*, 23:485-9, 2012.

Jokela P, Piiparinen H, Mannonen L, Auvinen E, Lappalainen M. Performance of a the Luminex xTAG Respiratory Viral Panel Fast in a clinical laboratory setting. *J Virol Meth*, 182:82-86, 2012.

Qian K, Auvinen E, Greco D, Auvinen P. miRSeqNovel: An R based workflow for analyzing miRNA sequencing data. *Mol Cell Probes*, 26:208-11, 2012.

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Helanterä I, Salmela K, Kyllönen L, Räisänen-Sokolowski A, Auvinen E, Mannonen L, Koskinen P, Lautenschlager I. BKV viremia in a well-HLA-matched kidney transplant population mainly on low-dose cyclosporine-based immunosuppression. *Clin Transplant*, DOI: 10.1111/ctr.12040, 2012.

Koskenvuo M, Dumoulin A, Lautenschlager I, Auvinen E, Mannonen L, Anttila VJ, Jahnukainen K, Saarinen-Pihkala UM, Hirsch HH. BK polyomavirus-

associated hemorrhagic cystitis among pediatric allogeneic bone marrow transplant recipients: Treatment response and evidence for nosocomial infection. *J Clin Virol*, 56:77-81, 2013.

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Ilmarinen T, Hagström J, Haglund C, Auvinen E, Leivo I, Pitkäranta A, Aaltonen LM. Low expression of nuclear toll-like receptor 4 in laryngeal papillomas transforming into squamous cell carcinoma. *Otolaryngol Head Neck Surg* DOI: 10.1177/0194599814549730, 2014.

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Lautenschlager I, Jahnukainen T, Kardas P, Lohi J, Auvinen E, Mannonen L, Dumoulin A, Jalanko H, Hirsch H. A case of primary JC polyomavirus infection-associated nephropathy. *Am J Transplant*, 14:2887-92, 2014.

Koskenvuo M, Lautenschlager I, Piotr Kardas, Auvinen E, Mannonen L, Huttunen P, Taskinen M, Vettenranta K, Hirsch HH. Diffuse gastrointestinal bleeding and BK polyomavirus replication in a paediatric allogeneic haematopoietic stem cell transplant patient. *J Clin Virol*, 62:72-4, 2015.

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Bergner S, Halec G, Schmitt M, Aubin F, Alonso A, Auvinen E. Individual and complementary effects of human papillomavirus oncogenes on epithelial cell proliferation and differentiation. *Cells Tissues Organs*, 201:97-108, 2016.

Helanterä I, Hirsch HH, Wernli M, Ortiz F, Lempinen M, Räisänen-Sokolowski A, Auvinen E, Mannonen L, Lautenschlager I. Simultaneous BK polyomavirus (BKPyV)-associated nephropathy and hemorrhagic cystitis after living donor kidney transplantation. *J Clin Virol*, 76:4-7, 2016.

Virtanen E, Pietilä T, Nieminen P, Qian K, Auvinen E. Low expression levels of putative HPV encoded microRNAs in cervical samples. [Springerplus](#) 2016

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- Virtanen E, Kalliala I, Dyba T, Nieminen P, Auvinen E. Performance of mRNA- and DNA-based high-risk human papillomavirus assays in detection of high-grade cervical lesions. *Acta Obstetr Gynecol Scand*, 96:61-68, 2017.
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- Ilmarinen T, Munne P, Hagström J, Virtanen E, Speel EJM, Auvinen E, Aaltonen LM. Prevalence of high-risk human papillomavirus infection and cancer gene mutations in non-malignant tonsils. *Oral Oncology*, 73:77-82, 2017.
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- Seppälä H, Helanterä I, Laine P, Lautenschlager I, Paulín L, Jahnukainen T, Auvinen P, Auvinen E. Archetype JC polyomavirus prevails in a rare case of JC polyomavirus nephropathy and in stable renal transplant recipients with JC polyomavirus viruria. *J Infect Dis*, 216:981-9, 2017.
- Virtanen E, Laurila P, Hagström J, Nieminen P, Auvinen E. Testing for high-risk HPV in cervical and tonsillar paraffin-embedded tissue using a cartridge-based assay. *APMIS*, DOI 10.1111/1pm.12727, 2017.
- Oswald E, Reinz E, Voit R, Aubin F, Alonso A, Auvinen E. Human papillomavirus type 8 E7 protein binds nuclear myosin 1c and downregulates the expression of pre-rRNA. *Virus Genes* DOI 10.1007/s11262-017-1491-6, 2017.
- Virtanen E, Seppälä H, Helanterä I, Laine P, Lautenschlager I, Paulín L, Mannonen L, Auvinen P, Auvinen E. BK polyomavirus microRNA expression and sequence variation in polyomavirus-associated nephropathy. *J Clin Virol*, 102:70-6, 2018.
- Virtanen E, Mannonen L, Lappalainen M, Auvinen E. Genotyping of Hepatitis C virus by nucleotide sequencing: A robust method for a diagnostic laboratory. *MethodsX*, 5:414-8, 2018.
- Miettinen J, Lautenschlager I, Weissbach F, Wernli M, Auvinen E, Mannonen L, Lauronen J, Hirsch HH, Jalanko H. BK polyomavirus viremia and antibody responses of pediatric kidney transplant recipients in Finland. *Pediatr Transplant* 2019;23:e13324, 2019.

- Oswald E, Kirschberg M, Aubin F, Alonso A, Hufbauer M, Akgül B, Auvinen E. BetaHPV E6 and E7 colocalize with NuMa in dividing keratinocytes. *Virus Genes* DOI 10.1007/a11262-019-01685-9, 2019.
- Liimatainen H, Weseslindtner L, Strassl R, Aberle SA, Bond G, Auvinen E. Next-generation sequencing shows marked rearrangements of BK polyomavirus that favour but are not required for polyomavirus-associated nephropathy. *J Clin Virol* 2020 Jan;122:104215. doi: 10.1016/j.jcv.2019.104215.
- Bergqvist L, Kalliala I, Aro K, Auvinen E, Jakobsson M, Kiviharju M, Virtanen S, Dillner J, Nieminen P, Louvanto K. Distribution of HPV genotypes differs depending on behavioural factors among young women. *Microorganisms* 2021 Apr 2;9(4):750. doi: 10.3390/microorganisms9040750.
- Viitasalo S, Ilmarinen T, Lilja M, Hytönen M, Hammarén-Malmi S, Auvinen E, Hagström J, Dillner J, Aaltonen LM. HPV-positive status is an independent factor associated with sinonasal inverted papilloma recurrence. *Laryngoscope* 132:1714-1718, 2022.
- Kartau M, Auvinen E, Verkkoniemi-Ahola A, Mannonen L, Helanterä I, Anttila VJ. JC polyomavirus DNA detection in clinical practice. *J Clin Virol* 2022 Jan;146:105051. doi: 10.1016/j.jcv.2021.105051.
- Auvinen E, Nieminen P, Pellinen J, Dillner J, Tarkkanen J, Virtanen A. HPV self-sampling with mRNA testing benefits routine screening. *Int J Cancer* 2022 Jun 18. doi: 10.1002/ijc.34170. Online ahead of print.
- [Kiviharju M](#), [Heinonen A](#), [Jakobsson M](#), [Virtanen S](#), Auvinen E, Kotaniemi-Talonen L, Dillner J, Kyrgiou M, [Nieminen P](#), [Aro K](#), [Kalliala I](#). Overtreatment rate after immediate local excision of suspected cervical intraepithelial neoplasia: a prospective cohort study. *Gynecol Oncol* 167:167-173, 2022.
- Honkima A, Suppala J, Tynninen O, Saarela M, Liimatainen H, Laine P, Auvinen P, Auvinen E. JC polyomavirus modifies the expression of human microRNAs in PML brain. *J Infect Dis* J Infect Dis Mar 29;jiad083. doi: 10.1093/infdis/jiad083. Online ahead of print, 2023. JUFO 2

Review Articles

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- Bravo IG, Alonso A, Auvinen E. Human papillomavirus type 16 E5 protein. *Papillomavirus Rep*, 15:1-6, 2004.
- Auvinen E, Airas L, Leirisalo-Repo M, Himanen AK, Hedman K, Sihvo S. JCV-vasta-ainemääritys PML-riskin arvioinnissa biologisia hoitoja saavilla immuunivälitteisiä tauteja sairastavilla potilailla. *Suomen Lääkäril*, 21:1565-

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Polyoomavirukset sairauksien aiheuttajina. *Duodecim*, 132:439-45, 2016.

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Publications in Professional Journals

Auvinen, E. Papilloomavirusten ja klamydian aiheuttamat yhteisinfektiot [Coninfections caused by human papillomavirus and Chlamydia trachomatis]. *Moodi* 1:53, 2005.

Auvinen, E. Luminex-tekniikan käyttömahdollisuuksia virusdiagnoosissa [Use of Luminex technology in viral diagnostics]. *KliinLab* 3:49-51, 2011.

Auvinen E. HPV-diagnostiikan menetelmät ja käytännöt [Methods and practices of HPV diagnostics]. *Moodi* 38:70-71, 2014.

Auvinen E, Auvinen P. Massiiviparalleelisekvensointi (NGS) mikrobiologian näkökulmasta – ja miten se liittyy Leo Tolstoiin [Massive parallel sequencing (NGS) in microbiology – and what it has to do with Leo Tolstoy]. *Moodi* 4/2017.

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Textbook Chapters

Auvinen E, Vaheri A. Kasvainvirukset [Tumour viruses]. In: Lääketieteellinen mikrobiologia, immunologia ja infektiosairaudet. Duodecim, Helsinki, Finland, 2003.

Auvinen E, Paavonen J. Papilloomavirukset [Papillomaviruses]. In: Mikrobiologia ja infektiosairaudet. Duodecim, Helsinki, Finland, 2010.

Jakobsson M, Nieminen P, Hiltunen-Back E, Rantsi T, Pakarinen P, Mäenpää J, Auvinen E. Gynekologiset infektiot [Gynaecological infections]. In: Naistentaudit ja synnytykset [Obstetrics and gynaecology]. Duodecim, Helsinki, Finland, 2019.

Auvinen E, Nieminen P. Papilloomavirukset [Papillomaviruses]. In: Mikrobiologia ja infektiosairaudet [Microbiology and infectious diseases]. Duodecim, Helsinki, Finland, 2020.

Auvinen E, Hedman K. Polyoomavirukset [Polyomaviruses]. In: Mikrobiologia ja infektiosairaudet [Microbiology and infectious diseases]. Duodecim, Helsinki, Finland, 2020.

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