



Bare lymphocyte syndrome type I

Bare lymphocyte syndrome type I (BLS I) is an inherited disorder of the immune system (primary immunodeficiency). Immunodeficiencies are conditions in which the immune system is not able to protect the body effectively from foreign invaders such as bacteria or viruses. Starting in childhood, most people with BLS I develop recurrent bacterial infections in the lungs and airways (respiratory tract). These recurrent infections can lead to a condition called bronchiectasis, which damages the passages leading from the windpipe to the lungs (bronchi) and can cause breathing problems.

Many people with BLS I also have open sores (ulcers) on their skin, usually on the face, arms, and legs. These ulcers typically develop in adolescence or young adulthood. Some people with BLS I have no symptoms of the condition.

People with BLS I have a shortage of specialized immune proteins called major histocompatibility complex (MHC) class I proteins on cells, including infection-fighting white blood cells (lymphocytes), which is where the condition got its name.

Frequency

BLS I is a rare disorder with an unknown prevalence. About 30 affected individuals have been described in the medical literature. The condition is likely underdiagnosed, because doctors may not investigate the underlying cause of respiratory tract infections.

Genetic Changes

BLS I is usually caused by mutations in the *TAP1* or *TAP2* gene. Each of these genes provides instructions for making a protein that plays a role in helping the immune system recognize and fight infections. In particular, the TAP1 and TAP2 proteins aid the function of MHC class I proteins.

The TAP1 and TAP2 proteins attach (bind) together to form a protein complex called transporter associated with antigen processing (TAP) complex. This complex, which is found in the membrane of a cell structure called the endoplasmic reticulum, moves (transports) protein fragments (peptides) from foreign invaders into the endoplasmic reticulum. There, the peptides are attached to MHC class I proteins. The peptide-bound MHC class I proteins are then moved to the surface of the cell so that specialized immune system cells can interact with them. When these immune system cells recognize the peptides as harmful, they launch an immune response to get rid of the foreign invaders.

Mutations in the *TAP1* or *TAP2* gene prevent formation of the TAP complex, which impairs the transport of peptides into the endoplasmic reticulum. Because there are no peptides for MHC class I proteins to bind, they are broken down, which results in

a shortage of MHC class I proteins on the surface of cells. A lack of these proteins impairs the body's immune response to bacteria, leading to recurrent bacterial infections. Researchers are unsure why people with BLS I do not also get viral infections, but they suspect that other immune processes are able to recognize and fight viruses. It is also not clear how *TAP1* and *TAP2* gene mutations are involved in the development of skin ulcers.

Mutations in another gene involved in the attachment of peptides to MHC class I proteins very rarely cause BLS I.

Inheritance Pattern

This condition is inherited in an autosomal recessive pattern, which means both copies of the gene in each cell have mutations. The parents of an individual with an autosomal recessive condition each carry one copy of the mutated gene, but they typically do not show signs and symptoms of the condition.

Other Names for This Condition

- HLA class I deficiency

Diagnosis & Management

General Information from MedlinePlus

- Diagnostic Tests
<https://medlineplus.gov/diagnostictests.html>
- Drug Therapy
<https://medlineplus.gov/drugtherapy.html>
- Genetic Counseling
<https://medlineplus.gov/geneticcounseling.html>
- Palliative Care
<https://medlineplus.gov/palliativecare.html>
- Surgery and Rehabilitation
<https://medlineplus.gov/surgeryandrehabilitation.html>

Additional Information & Resources

MedlinePlus

- Encyclopedia: Immunodeficiency disorders
<https://medlineplus.gov/ency/article/000818.htm>
- Health Topic: Immune System and Disorders
<https://medlineplus.gov/immunesystemanddisorders.html>

Educational Resources

- KidsHealth from Nemours: Immune System
<http://kidshealth.org/en/parents/immune.html?ref=search>
- MalaCards: bare lymphocyte syndrome, type i
http://www.malacards.org/card/bare_lymphocyte_syndrome_type_i
- Merck Manual Consumer Version: Overview of Immunodeficiency Disorders
<https://www.merckmanuals.com/home/immune-disorders/immunodeficiency-disorders/overview-of-immunodeficiency-disorders>
- Merck Manual Consumer Version: Overview of the Immune System
<https://www.merckmanuals.com/home/immune-disorders/biology-of-the-immune-system/overview-of-the-immune-system>

Patient Support and Advocacy Resources

- Immune Deficiency Foundation
<https://primaryimmune.org/>
- International Patient Organization for Primary Immunodeficiencies
<https://ipopi.org/>
- Jeffrey Modell Foundation
<http://www.info4pi.org/>
- Resource List from the University of Kansas Medical Center: Immune Deficiency Conditions
<http://www.kumc.edu/gec/support/immune.html>

ClinicalTrials.gov

- ClinicalTrials.gov
<https://clinicaltrials.gov/ct2/results?cond=%22bare+lymphocyte+syndrome+type+i%22+OR+%22bare+lymphocyte+syndrome%22>

Scientific Articles on PubMed

- PubMed
<https://www.ncbi.nlm.nih.gov/pubmed?term=%28%28bare+lymphocyte+syndrome+type+i%5BTIAB%5D%29+OR+%28HLA+class+i+deficiency%5BTIAB%5D%29+OR+%28MHC+class+i+deficiency%5BTIAB%5D%29+OR+%28TAP+deficiency%5BTIAB%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+3600+days%22%5Bdp%5D>

OMIM

- BARE LYMPHOCYTE SYNDROME, TYPE I
<http://omim.org/entry/604571>

Sources for This Summary

- Eggensperger S, Tampé R. The transporter associated with antigen processing: a key player in adaptive immunity. *Biol Chem*. 2015 Sep;396(9-10):1059-72. doi: 10.1515/hsz-2014-0320. Review. *Citation on PubMed*: <https://www.ncbi.nlm.nih.gov/pubmed/25781678>
- Gadola SD, Moins-Teisserenc HT, Trowsdale J, Gross WL, Cerundolo V. TAP deficiency syndrome. *Clin Exp Immunol*. 2000 Aug;121(2):173-8. Review. *Citation on PubMed*: <https://www.ncbi.nlm.nih.gov/pubmed/10931128>
Free article on PubMed Central: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1905688/>
- Hanalioglu D, Ayvaz DC, Ozgur TT, van der Burg M, Sanal O, Tezcan I. A novel mutation in TAP1 gene leading to MHC class I deficiency: Report of two cases and review of the literature. *Clin Immunol*. 2017 May;178:74-78. doi: 10.1016/j.clim.2017.01.011. Epub 2017 Feb 2. *Citation on PubMed*: <https://www.ncbi.nlm.nih.gov/pubmed/28161407>
- Parcej D, Tampé R. ABC proteins in antigen translocation and viral inhibition. *Nat Chem Biol*. 2010 Aug;6(8):572-80. doi: 10.1038/nchembio.410. Review. Erratum in: *Nat Chem Biol*. 2010 Oct;6(10):782. *Citation on PubMed*: <https://www.ncbi.nlm.nih.gov/pubmed/20644544>
- Villa-Forte A, de la Salle H, Fricker D, Hentges F, Zimmer J. HLA class I deficiency syndrome mimicking Wegener's granulomatosis. *Arthritis Rheum*. 2008 Aug;58(8):2579-82. doi: 10.1002/art.23675. *Citation on PubMed*: <https://www.ncbi.nlm.nih.gov/pubmed/18668571>
- Zimmer J, Andrès E, Donato L, Hanau D, Hentges F, de la Salle H. Clinical and immunological aspects of HLA class I deficiency. *QJM*. 2005 Oct;98(10):719-27. Epub 2005 Aug 8. Review. *Citation on PubMed*: <https://www.ncbi.nlm.nih.gov/pubmed/16087697>

Reprinted from Genetics Home Reference:

<https://ghr.nlm.nih.gov/condition/bare-lymphocyte-syndrome-type-i>

Reviewed: August 2017

Published: March 20, 2018

Lister Hill National Center for Biomedical Communications
U.S. National Library of Medicine
National Institutes of Health
Department of Health & Human Services