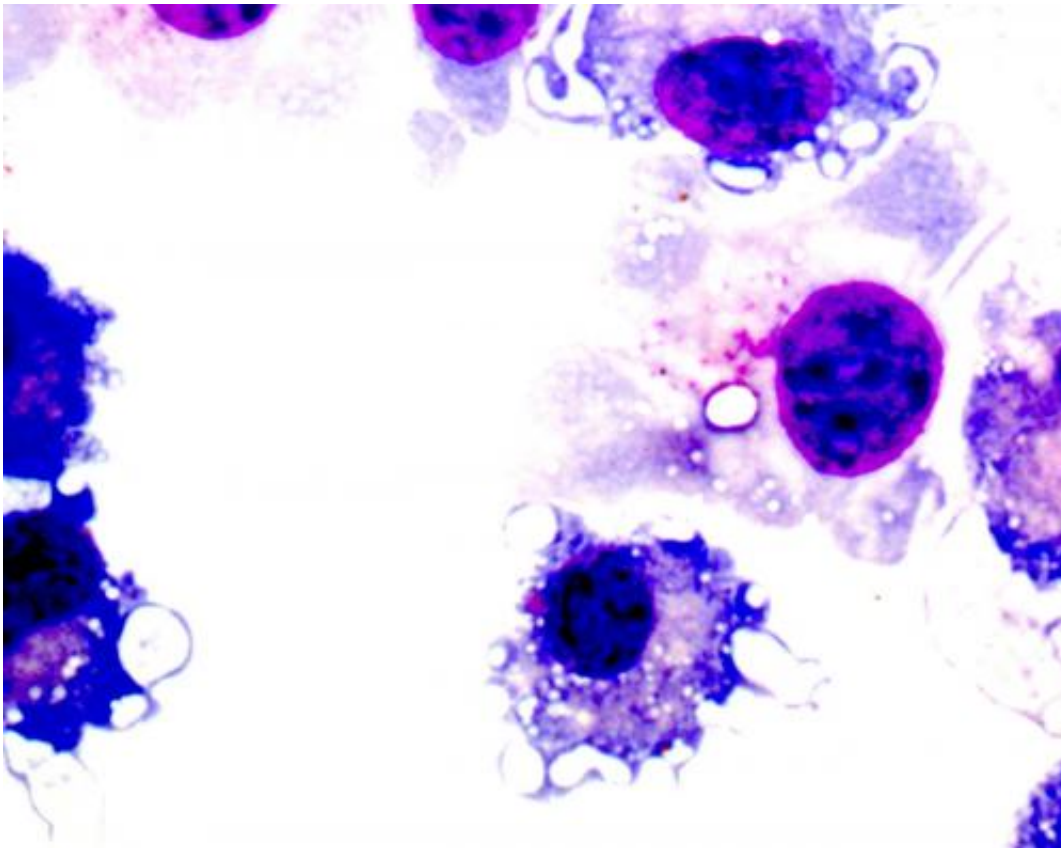


# Researchers uncover allergy-cancer connection

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MDSC (myeloid-derived suppressor cells) suppress the tumor-specific immune response. Credit: Dr. Alexandra Sevko, German Cancer Research Center

While many are stocking up on allergy medicine in preparation for spring, a new study from researchers at Virginia Commonwealth University Massey Cancer Center has uncovered a new connection

between allergy and cancer that could potentially lead to therapies involving common antihistamines.

Recently published in the *Journal of Leukocyte Biology*, the study was led by Daniel H. Conrad, Ph.D., member of the Cancer Cell Signaling research program at Massey and professor of microbiology and immunology at the VCU School of Medicine, with substantial contributions from Ph.D. students and co-first authors Rebecca K. Martin and Sheinei J. Saleem. The study demonstrated that [histamine](#), a component of the [immune system](#) that responds to allergens and foreign pathogens and is also linked to inflammation, plays a role in protecting tumors from the immune system. By blocking the production of histamine in animal models, the researchers were able to interrupt a process that promotes melanoma growth.

"This research is very exciting as it draws a connection between two diseases that aren't commonly linked: allergy and [cancer](#)," says Conrad. "However, it's important to realize that this connection is very novel and further research is needed before we know if [antihistamines](#) can be used effectively in cancer therapies."

Histamine is produced by mast cells, which are especially numerous in the nose, mouth and blood vessels to help defend against pathogens and aid in wound healing. The researchers found that histamine induces the activation, survival and proliferation of myeloid derived suppressor cells (MDSCs), which help promote tumor growth by suppressing the immune system. They also discovered that MDSCs tend to migrate toward mast cells, which help traffic the MDSCs to sites of inflammation such as the liver and tumors. The cycle continues as histamine released by mast cells further promotes the survival and proliferation of MDSCs. This occurs in two subpopulations of MDSCs, but most dramatically in the monocytic subpopulation. Through their experiments, the researchers showed that monocytic MDSCs can be decreased by over-the-counter

antihistamines such as cetirizine (Zyrtec) and cimetidine (Tagamet).

In addition, the researchers found that patients experiencing allergic symptoms have more MDSCs circulating in their bloodstream than non-allergic patients.

"MDSCs have generated a great deal of interest in recent years because they limit the effects of the immune response against cancer," says study collaborator Harry D. Bear, M.D., Ph.D., member of the Developmental Therapeutics research program at Massey, professor and chair of the Division of Surgical Oncology at the VCU School of Medicine and director of the Breast Health Center at VCU Health System. "Now that we have shown that antihistamines can interfere with the production of MDSCs, we are hopeful that we may be able to use them to restore the immune system's ability to fight off tumors."

Previously, the research team found that [mast cells](#) were essential for MDSC activity. Their next step is to further dissect the mechanism of the mast cell and MDSC interaction and the involvement of other mast cell mediators, like histamine, in MDSC function.

**More information:** [www.jleukbio.org/content/early ...  
3-644R.full.pdf+html](http://www.jleukbio.org/content/early/2014/03/19/jleukbio.2014-03-644R.full.pdf+html)

Provided by Virginia Commonwealth University

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