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## PRESS RELEASE

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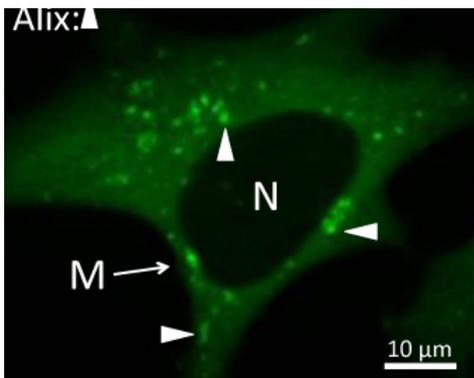
### EXIT DISCOVERED IN CELLULAR GARBAGE TRUCK

Immersed in the inner workings of a highly selective refuse collection

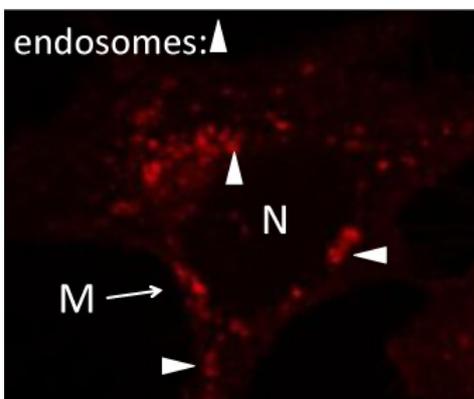
A protein known as Alix is present in cells during viral infections. It is also found in build-ups of cholesterol. So what does it do? Researchers from the Department of Biochemistry at the Faculty of Science at UNIGE have detailed the role in the journey that it makes from the inner wall of the membrane towards the outside; they have also uncovered that its main activity consists of opening a final exit in the evacuation process and the treatment of cellular waste. These observations are the focus of a publication in the next edition of the online journal *Development Cell*.

At the University of Geneva (UNIGE), the team led by Professor Jean Gruenberg has long been interested in the movement of lysosomes, the sub-compartments of cells to where endocytic vesicles deliver their waste content and the molecules destined to be destroyed. Within this context, researcher Christin Bissig, along with her international colleagues, carried out a detailed study of the route taken by Alix which is lodged inside the endosomal membrane. This tailing has highlighted how protein contributes to avoiding cellular digestion, like a door opening into the endosomal transporter garbage bin, bringing about a final waste sorting operation which determines the cell's health. The researchers also showed how vesicular stomatitis makes use of the same route to penetrate the inside of the cell and infect it.

Finally, they identified a lipid, partnered with Alix in this process and present only in the late endosome. This is the first characterisation of the protein-lipid partnership throughout the atom.



Light microscopy pictures of the same cell taken at two different wavelengths. M=membrane, N=nucleus.  
© Christin Bissig



Arrow heads indicate examples of endosomes that display Alix. © Christin Bissig

#### Refuse collection and the path of life

Endosomes and lysosomes are 0.2 to 0.5 cell organelles and are present in all animal cells. Their role is to sort molecules and ensure inter-cell digestion and regulation. In all eukaryotes from yeast to human, they carry then transform or destroy proteins, lipids or sugars which the cell feeds on in order to grow and regenerate. In a certain number of diseases or conditions, lysosomes and endosomes are reached and they no longer carry out their transport or degradation work. This is particularly the case with people suffering from lysosomal diseases. The cells are then clogged with waste. The organism is deregulated, even intoxicated. This path taken by these essential refuse collectors therefore merits greater recognition and documentation.

Lodged inside the endosomes, the Alix protein takes this same route, known as endocytosis, where molecules and particles travel from the

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external cell membrane to the cell's interior. Through this in-depth study biochemists have, without knowing it, opened up fresh applied research perspectives, relating particularly to the worst forms of cholesterol: that which accumulates in lysosomes and endosomes.

### **Biomedical perspectives**

Contributing to the understanding of cholesterol transport - the good, the bad and the most damaging - and mapping out a pathway through which a number of viruses surge; such are the contributions of this fundamental research.

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