

Exit discovered in cellular garbage truck: Immersed in the inner workings of a highly selective refuse collection

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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.

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 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.

These observations are the focus of a publication in the next edition of online journal *Development Cell*.

Provided by University of Geneva

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