

de Duve C & Wattiaux R. Functions of lysosomes.

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To assemble available data in a manner most likely to reveal a unifying picture of lysosome functioning and to underline the gaps in our knowledge are the two purposes of this review, which deals mostly with cellular mechanisms, more briefly with physiological functions and pathological disorders. [The *SCI*³ indicates that this paper has been cited in over 1,910 publications since 1966.]

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From time to time in the course of my scientific career, I have felt the need to sit back and look over my results of the last few years, to try to put them together and to fit them within a broader framework. The year 1965 provided a golden opportunity for such an exercise. We had just published the 18th and last installment of the "Tissue fractionation studies" series, which appeared in the *Biochemical Journal* between 1951 and 1964. The very title of that paper¹ actually stated what remains as the main outcome of a 15-year effort by a dozen or so young investigators who were associated with me during that period: "Resolution of mitochondrial fractions from rat liver into three distinct populations of cytoplasmic particles...." The three populations included two new groups, in addition to the well-known

mitochondria: the acid-hydrolase containing particles that we had named *lysosomes* in 1955—in paper number six of the series,² itself a *Citation Classic* in 1977—and another group of particles, characterized by the association of the H₂O₂-consuming catalase with several H₂O₂-producing oxidases, soon to be called *peroxisomes*.³ Completing the biochemical findings, a paper published at the same time in the *Journal of Cell Biology*⁴ had conferred on the two new entities the respectability of a morphological identity. The time was obviously ripe for a survey.

I enlisted the collaboration of two trusted co-workers, Robert Wattiaux, who had recently become Professor of Biochemistry at the Facultés Universitaires Notre-Dame de la Paix in Namur, and Pierre Baudhuin, a member of the Department of Biochemistry at the University of Louvain School of Medicine, where he is now professor. With Wattiaux I wrote the review on lysosomes that is under consideration here. Its twin, dealing with peroxisomes, was published concomitantly in *Physiological Reviews* with Baudhuin as co-author.⁵ Because the field was less advanced, the peroxisome paper still had to deal largely with proofs and individual pieces of evidence. In contrast, lysosomes were already well established and had been investigated in many different tissues and in a variety of physiological and pathological contexts. Our review was the first attempt to assemble and organize the available information, to delineate common basic mechanisms behind the motley manifestations of lysosome function, and to devise some sort of coherent terminology. In fact, no comparable attempt has since been made, or could be made, at least in such compact form. Readers interested in the lysosome field now have to turn to whole books, including the seven-volume collection, *Lysosomes in Biology and Pathology*.⁶ This probably explains why our 20-year-old review still continues to be quoted.

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2. de Duve C, Pressman B C, Gianetto R, Wattiaux R & Appelmans F. Tissue fractionation studies. 6. Intracellular distribution patterns of enzymes in rat-liver tissue. *Biochem J.* 60:604-17, 1955. [See also: de Duve C. *Citation Classic, Current Contents* (12):11, 21 March 1977.]
3. de Duve C. Functions of microbodies (peroxisomes). *J. Cell Biol.* 27:25A-26A, 1965. (Cited 65 times.)
4. Baudhuin P, Beaufay H & de Duve C. Combined biochemical and morphological study of particulate fractions from rat liver. *J. Cell Biol.* 26:219-43, 1965. (Cited 200 times.)
5. de Duve C & Baudhuin P. Peroxisomes (microbodies and related particles). *Physiol. Rev.* 46:323-57, 1966. (Cited 810 times.)
6. *Lysosomes in biology and pathology*. Amsterdam: North-Holland, 1969-1984. Vols. 1-7.