

# リソソーム膜糖タンパク質 (Lamp-2) の 生合成：初期エンドソームを経由する主要 な輸送ルート

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## **Biosynthetic Transport of a Major Lysosome-Associated Membrane Glycoprotein 2, Lamp-2: A Significant Fraction of Newly Synthesized Lamp-2 Is Delivered to Lysosomes by Way of Early Endosomes**

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**ABSTRACT** Lysosomal membranes contain two highly glycosylated proteins, designated as lamp-1 and lamp-2, as major components. Lamp-1 and lamp-2 are similar to each other in the protein structure. Here, we investigated the biosynthetic transport of lamp-2 through the endocytic vacuoles in cultured rat hepatocytes in comparison with that of lamp-1, which has previously been studied [Akasaki *et al.* (1995) *Exp. Cell Res.* 220, 464-473]. Newly synthesized lamp-2 (NS-lamp-2) was transported to the trans-Golgi from rough endoplasmic reticulum with a half time ( $t_{1/2}$ ) of 32 min, more slowly than NS-lamp-1 ( $t_{1/2}$ =13 min). After leaving the trans-Golgi, NS-lamp-2 is transferred to at least three compartments; the cell surface ( $t_{1/2}$ =47 min), cell peripheral early endosomes ( $t_{1/2}$ =38 min) and perinuclear late endosomes ( $t_{1/2}$ =48 min). NS-lamp-2 transported to any compartment is delivered finally to lysosomes ( $t_{1/2}$ =90 min). A significant fraction of NS-lamp-2 (45% of the total) was transported from the trans-Golgi to early endosomes, and then delivered to dense lysosomes via perinuclear late endosomes, whereas a major portion of NS-lamp-1 follows an intracellular route to late

endosomes without passing through the cell periphery. NS-lamp-2 leaves the cell peripheral region more rapidly than NS-lamp-1. The kinetic and quantitative data for biosynthetic transport of NS-lamp-2 to early endosomes and the cell surface indicate that NS-lamp-2 may be transported first to early endosomes, from which a small portion of it (~3.5% of the total) moves to the plasma membrane via a recycling system. In contrast, a small fraction of NS-lamp-1 is transported to the plasma membrane directly from the trans-Golgi, since NS-lamp-1 is delivered to the plasma membrane and early endosomes with almost the same half times.

抄録 リソソーム膜には二つの多量に糖鎖を含む糖タンパク質 (lamp-1とlamp-2) が主要な成分として含まれる。本論文では、新たに合成されたlamp-2 (NS-lamp-2) のエンドサイトーシス系における輸送を調べて、以前に調べたlamp-1のそれと比較した。NS-lamp-2はトランスーゴルジから、細胞表面、初期エンドソームおよび後期エンドソームへ輸送された。45%のNS-lamp-2は初期エンドソームへ輸送された。これに対してNS-lamp-1はその約25%が初期エンドソームを経由してリソソームへ輸送された。非常にわずかのNS-lamp-2が細胞表面に出現するが、これは初期エンドソームに輸送されたNS-lamp-2の一部がリサイクリング系を経て細胞表面へ輸送されたと考えられる。一方、NS-lamp-1はトランスーゴルジから直接、細胞表面に輸送され、その後初期エンドソームへ運ばれるものとみられる。