31. Cellular responses initiated by recognition of glycans and its application to medical treatment

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We report a new technology involving macrophages as a vehicle for delivery of antigens and drugs to lymphoid tissues using oligomannose-coated liposomes (OML) as the delivery platform. When OML encased with fluorescence-labeled protein was injected intraperitoneally, OML was rapidly and specifically incorporated into CD11b-positive cells and the OML-incorporating cells were accumulated at the extra-nodal lymphoid tissues in omentum. In addition, OML-incorporating cells produced significant amount of IL-12, which is a cytokine required for induction of Th1 cells. Furthermore, antigenic peptides derived from the encased antigen were presented on both MHC class I and class II molecules of macrophages. Based on these cellular responses initiated by recognition of oligomannose, we successfully induced OML-encased antigen-specific Th1 responses and CTL by administration of OML in mice, and controlled tumor progression and infectious diseases. We also report the use of intraperitoneal macrophages as a novel drug-delivery vehicle for the control of cancer metastatic to milky spots.