
The role of HIV and monocytes/macrophages in adipose tissue biology

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Abstract

OBJECTIVE:

To assess the role of HIV and monocytes/macrophages in adipose tissue dysregulation.

METHODS:

Cross-sectional study in 5 groups: HIV seronegative, HIV+ antiretroviral therapy (ART)-naive, HIV+ nonlipoatrophic on zidovudine- and/or stavudine-containing ART, HIV+ lipoatrophic on similar ART, and HIV+ on abacavir- or tenofovir-containing ART. HIV DNA in circulating monocyte subsets was quantitated by real-time polymerase chain reaction. Biopsied subcutaneous fat was examined for macrophage content by CD68 staining. Isolated adipocytes and macrophages were cultured and the supernatant assayed for secretory products by Luminex multiplex cytokine technology.

RESULTS:

Sixty-nine subjects were enrolled. Lipoatrophic subjects had higher median HIV DNA levels (270.5 copies/10 cells) in circulating peripheral CD14CD16 co-expressing monocyte subsets compared with subjects who were ART-naive (25.0 copies), nonlipoatrophic (15.0 copies), or on abacavir/tenofovir (57.5 copies), P < 0.01. Group differences in adipocytes and adipose macrophage content were marginal. Although adipocyte secretory products were similar, HIV-infected subjects had higher adipose macrophage-derived interleukin (IL)-12p40, IL-6, IL-8, and monocyte inflammatory protein 1 alpha and lower eotaxin and interferon gamma levels than HIV seronegative subjects (P < 0.05). Within HIV-infected subjects, adipose macrophage secretory products were comparable between subjects naive with ART versus those on ART.

CONCLUSIONS:

Circulating HIV-infected and proinflammatory CD14CD16 monocyte subsets contribute to the pathogenesis of HIV-associated lipoatrophy. Among HIV-infected individuals, macrophages, rather than adipocytes, are the primary source of low-grade inflammation in subcutaneous adipose tissue. HIV infection modifies these macrophages to a more proinflammatory phenotype, and these changes are not substantially mitigated by the use of ART.

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