How Do Body Fat and Exercise Modulate Vitamin D Status?

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Obesity has been associated with lower levels of serum 25-hydroxyvitamin D (25OHD) in several studies, including the third National Health and Nutrition Examination Survey (NHANES III). The mechanism is not known for certain, but hypotheses include sequestration in fat, increased clearance by a larger body fat pool, negative feedback from higher circulating $1,25(OH)_2D$ levels in obesity or lower sun exposure due to avoidance of outdoor activity by the obese. Physical activity is also related to serum 25OHD, with higher activity linked with higher levels of 25OHD. Whether this reflects a direct relationship between activity and vitamin D metabolism or is a result of confounding by body fat or sun exposure is not certain. In NHANES III, the relationship between serum 25OHD and either body fat or physical activity differs by race, with a weaker relationship appearing in African Americans than in Whites.