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# Vitamin D receptor genotypes influence quadriceps strength in chronic obstructive pulmonary disease<sup>1,2,3</sup>

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**Background:** Quadriceps weakness is an important complication of chronic obstructive pulmonary disease (COPD) and is associated with impaired exercise capacity and greater mortality. Its etiology is multifactorial, and evidence is growing that it is partly determined by genetic susceptibility.

**Objective:** Using an established cohort, we tested whether quadriceps weakness in patients with COPD is influenced by common variations in the gene for the vitamin D receptor.

**Design:** Vitamin D receptor *FokI* and *BsmI* genotypes and the (I/D) angiotensin-converting enzyme (ACE) and bradykinin receptor (+9/-9) genotypes were identified in 107 patients with stable COPD [ $\bar{x} \pm$  SD forced expiratory volume in 1 s (FEV<sub>1</sub>): 34.5 ± 16.5] and 104 healthy, age-matched control subjects. Quadriceps maximum voluntary contraction force and fat-free mass assessed by bioelectrical impedance analysis were measured.

**Results:** After adjustment for covariables, both patients and control subjects who were homozygous for the *C* allele of the *FokI* polymorphism had less quadriceps strength than did those with ≥1 *T* allele [41.0 ± 11.8 compared with 46.0 ± 13.2 kg (*P* = 0.01) and 32.5 ± 11.2 compared with 36.2 ± 13.1 kg (*P* = 0.005), respectively]. The *b* allele of the *BsmI* polymorphism was associated with greater quadriceps strength in patients—37.0 ± 13.3, 33.8 ± 11.6, and 33.8 ± 11.6 kg for *bb*, *bB*, and *BB*, respectively (*P* = 0.0005)—but had no effect in healthy control subjects. The effect of *BsmI* on quadriceps strength was least apparent in patients with the *ACE II* genotype (*P* = 0.003).

**Conclusions:** The *FokI* common variants in the *VDR* gene are associated with skeletal muscle strength in both patients and control subjects, whereas the *BsmI* polymorphism is associated with strength only in patients.

**Key Words:** Muscle • quadriceps • angiotensin-converting enzyme • bradykinin

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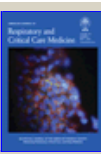
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