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Functional expression of transient receptor potential channels in human preadipocytes

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Background: Preadipocytes are extensively used as a type of proliferative cell culture model to investigate proliferation and differentiation of adipocytes and lipodystrophy (eg obesity)-related metabolic dysfunctions and disease. However, cell biology is not well understood in human preadipocytes. The present study was to investigate the expression of transient receptor potential (TRP) channels in human preadipocytes.

Methods: Human adipocytes were cultured in DMEM medium, and expression of TRP channels was using whole-cell patch voltage-clamp and RT-PCR approaches.

Results: A small background current was inhibited by the TRPC channel blocker La^{3+} . Removal of Mg^{2+} of pipette solution or bath solution induced a Mg^{2+} -sensitive current, which was suppressed by 2-aminoethoxydiphenyl borate. In addition, an intracellular calcium-activated current was inhibited by the TRPV channel blocker capsazepine. RT-PCR revealed that mRNAs of TRPC1, TRPC4, TRPV1, TRPV2, TRPV4, and TRPM7 are significant in human preadipocytes.

Conclusion: Our results demonstrate the novel information that multiple TRP channels, TRPC1/4, TRPV1/2/4, and TRPM7, are present in human preadipocytes. Roles of these channels in cell proliferation and adipogenesis are being investigated.

Evaluation of airway wall thickness with high-resolution computed tomography in severe stable asthmatics with sputum bacteria load

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Background: Studies have shown that potentially pathogenic bacteria in asthma is associated with neutrophilic inflammation. It is unclear whether this contributes to structural airway changes. This study used high-resolution computed tomography (HRCT) to compare changes in large and small airways against positive sputum culture in severe stable asthmatics.

Methods: Airway structure was assessed by a validated method using wall thickness (WT), wall area (WA), and WA corrected by body surface area (WA/BSA). WT and WA were corrected for total airway diameter and area (WT% and WA% respectively). We divided the bronchi into large airways with a lumen diameter (L) of ≥ 2 mm and small airways with $L < 2$ mm. Using HRCT at five set levels, WT and WA were recorded in severe stable asthma patients (n=56) separately with positive sputum culture (n=29) and negative culture (n=27).

Results: The commonest strains cultured in these asthmatic patients included *H influenzae*, *P aeruginosa*, and *S aureus*. In small airways, WA% and WT% showed no significant difference between the sputum culture-negative and -positive groups (79.1 \pm 6.8 vs 80.4 \pm 7.1) and (29.0 \pm 8.0 vs 28.6 \pm 4.3) respectively (P>0.05). Similarly, in large airways, there was no significant difference between the culture-negative vs culture-positive groups (WA% 68.1 \pm 5.7 vs 66.8 \pm 5.5) and (WT% 21.9 \pm 2.8 vs 21.5 \pm 2.5). WA and WA/BSA in the small airways showed a significant negative correlation with FEV₁% ($r = -0.37$ and $r = -0.37$, P<0.05). In contrast, WA/BSA in the large airways showed a significant positive correlation with FEV₁% ($r = 0.32$, P=0.03).

Conclusions: These findings suggest that bacterial load may not be related to airway wall thickness in asthma.