Storage and distribution of vitamin A isomers in human vocal fold mucosa

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ABSTRACT

Methods: and snap-frozen. Bilateral VF mucosae

blood. 

organs (including the larynx) via retinol-binding protein (RBP). Alternatively, VA can bypass the liver and be trafficked directly to extrahepatic organs by chylomicra. Chylomicron-mediated VA transport can be evaluated via detection of α-retinol, a VA isomer that cannot bind to RBP and therefore cannot be released from hepatic storage. The purpose of this study was to evaluate VA distribution (retinol; retinyl esters; α-retinol; α-retinyl esters) in human vocal fold (VF) mucosa, compared to that of liver and circulating blood.

Methods: Larynges, liver biopsies and blood sera were harvested from 10 adult human cadavers (6 male; 4 female; mean age 78.8±15.7 y) within 12 h postmortem and snap-frozen. Bilateral VF mucosae were dissected, and all tissue/serum samples were analyzed using UPLC to determine VA profiles and concentrations.

Results: Total VA and α-retinol concentrations in liver varied widely with certain individuals exhibiting VA deficiency or hypervitaminosis A, whereas retinol concentrations in serum and VF mucosa were held within a relatively narrow range. The VF mucosa exhibited significantly higher concentrations of VA in retinol compared to retinyl ester form (0.38±0.19 nmol/g versus 0.13±0.06 nmol/g, respectively; p<0.001). In this study, the VF mucosa was only detected in liver; α-ROH was not detected in any tissue.

Liver:

- Most VA was stored as RE (3.7±2.5% was in ROH form; 1.8±0.5% was in α-RE form).
- There was a significant correlation between RE and α-RE in liver (p<0.0005†).

Serum:

- Most VA was stored as ROH (99.0±1.1%) ROH concentrations were maintained in a narrow physiologic range (1539.4±740.3nmol/L), irrespective of liver RE stores.
- Serum ROH was significantly correlated with liver ROH (p=0.035†).

VF:

- More VA was stored in ROH form than in RE form (0.38±0.16 nmol/g vs. 0.13±0.10 nmol/g; p=0.001††).
- VF ROH concentration was weakly (and non-significantly) associated with ROH concentrations in liver and serum (p=0.117† and 0.183††).

CONCLUSIONS

The VF mucosa stores both VA and RE at low concentrations. Serum ROH concentrations are maintained within a narrow physiologic range that does not reflect hepatic storage.

REFERENCES


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