Relation between urinary hydration biomarkers and total fluid intake in healthy adults


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Introduction

Water is known to be essential for a wide variety of physiological functions. Compensation of water loss is key for maintaining proper physical and cognitive performance. Recent evidence suggest that water intake above simple loss replacement may be beneficial for long term health. Specifically, new studies have highlighted a relationship between water intake, hydration and recurrent kidney stone disease, chronic kidney disease, blood glucose regulation and cardiovascular events.

Despite this key role for sustaining health, a simple method for individuals to ensure sufficient water consumption in order to meet specific hydration needs is still lacking. Recent work by Armstrong et al., established reference ranges for various urinary and plasma hydration biomarkers relative to deciles of total water intake volume; this suggests the possibility of a linear association between intake and hydration biomarkers.

Our aim was to clarify whether strong linear relations exist between urinary hydration biomarkers and fluid intake and to evaluate the possibility of linking daily fluid intake volume to easily measured biomarkers.

Key Findings

In our investigation, we evaluated the strength of the correlations between 24h urinary biomarkers and daily fluid intake volume measured on 82 young healthy adults over the course of four consecutive days.

The results of this analysis suggest that: (1) hydration biomarkers in 24 h (24hU), but not first morning urine collections are strongly correlated with concurrent fluid intake volume; (2) several 24hU biomarkers, notably volume, osmolality, USG and color, demonstrate a high degree of collinearity across a broad range of values (osmolality versus color: r=0.49-0.76; USG versus color: r=0.46-0.78; osmolality versus USG: 0.86-0.97; P<0.001); (3) urine volume alone provides information about total water intake with accuracy comparable to multiple variables combined.

Relevance for Healthy Hydration

Our work demonstrates that fluid intake can be easily assessed with simple biological parameters measured in urine. Given the emerging evidence showing a link between fluid intake and long term health, regular measurement of urinary biomarkers in the general population may represent a simple way to adapt water intake to target kidney disease prevention.

Link to Journal: [http://www.nature.com/ejcn/journal/v67/n9/full/ejcn201393a.html](http://www.nature.com/ejcn/journal/v67/n9/full/ejcn201393a.html)