Comments on Inorganic Arsenic Key Science Issue 5: Upstream Biological Events for Clinical Disease

Barbara D. Beck, Ph.D., DABT, Fellow ATS
Gradient

Presented at the IRIS Bimonthly Public Science Meeting

GRADIENT

Science Issue 5: Upstream Biological Events for Clinical Disease

- Not all upstream biological changes are associated with clinical disease
- For clinically relevant biomarkers/upstream events, must consider magnitude of change associated with adversity
- Must consider biomarkers and other upstream endpoints in terms of specificity and sensitivity
  - Need to consider predictive value positive as well as the r^2 value of the predictive value

Science Issue 5: Upstream Biological Events for Clinical Disease (cont.)

- Many biomarkers used for cardiovascular disease not consistently linked to downstream disease processes, or too general to reflect a specific adverse event (*e.g.,* IL) (see Table 3)
  - Panels of CV biomarkers are likely superior to individual biomarkers, but optimal composition is unknown

Table 3. Biomarkers of Inflammation and Predictive Power for Cardiovascular Disease[a]

Biomarker	Methodology Standardized	Linked to Disease Prospectively	Additive to FHS Risk Score	Tracks with Disease Treatment
HsCRP	+++	+++	+	+/?
siCAM-1	+/-	++	?	?
IL-6	–	++	?	?
IL-18	–	++	?	?
SAA	–	-/+	?	?
MPO	+	+	?	–
sCD40	?	+	?	?

Notes:
a) Adapted from Vasan, 2006; many more markers evaluated in the full article.
–, no; ?, unknown or questionable/equivocal data; +, some evidence; ++, good evidence; +++, strong evidence
FHS, Framingham Heart Study; HsCRP, high-sensitivity C-reactive protein; IL, interleukin; MPO, myeloperoxidase; SAA, serum amyloid A; sCD40L, soluble CD40 ligand; sICAM, soluble intercellular adhesion molecule