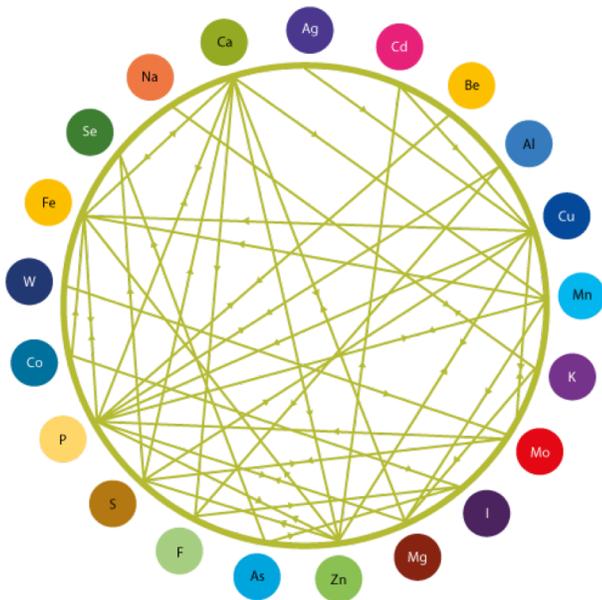


Changes in Mineral Testing: Implementing Tissue ICP-MS



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New Tissue Mineral Offerings at TVMDL

- TVMDL has validated and implemented our new ICP-MS technology for mineral testing, and we're now able to offer you both single metal testing and a full mineral panel! Mineral panel includes nutritional and heavy metals.

Individual metals - \$30/ea

- Copper
- Selenium
- Zinc
- Arsenic
- Lead

OR

Mineral Panel - \$40/all

- Copper
- Selenium
- Zinc
- Arsenic
- Lead
- Cobalt
- Iron
- Manganese
- Molybdenum
- Cadmium



Sample Selection – Tissue Minerals



- Liver – any species
 - Suitable for individual mineral AND for mineral panel testing
 - Note that, as always, we may not have interpretation data for exotics
- add Kidney – Lead (Pb) poisoning only, bovine only
- add Kidney – Copper (Cu) poisoning only, ruminants



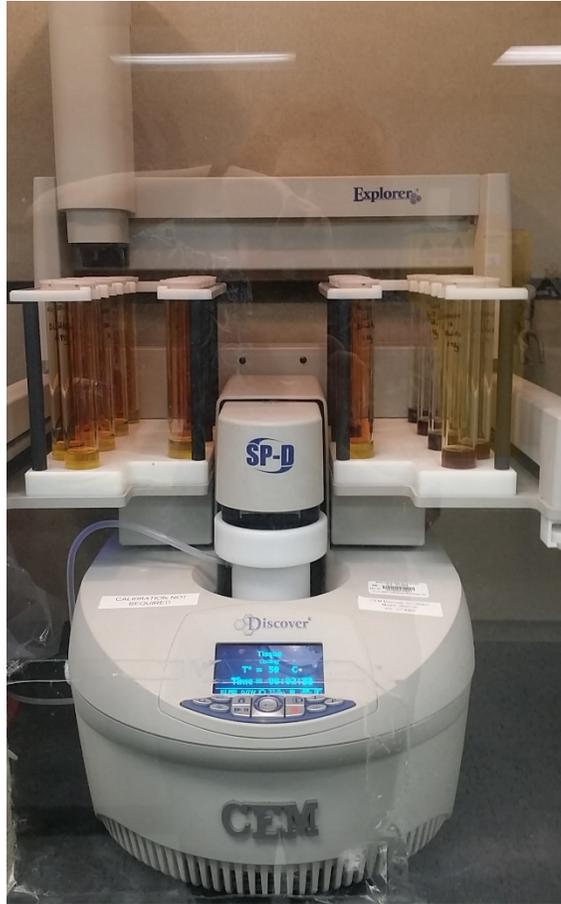
Sample Storage & Shipping – Tissue Minerals

- Fresh tissue – not in formalin
- No fluid added (no formalin, no saline)
- Plastic bag, double bagged for shipping
 - Tip: if adding Vitamin Panel (A&E) protect from light (foil outside bag)
- Can be stored frozen before shipping (not required)
- Ship chilled, on ice packs, overnight

- Testing on Tuesdays and Thursdays
- Results by Wednesday or Friday



For the curious: Sample Preparation



Solid samples (liver, kidney, brain, feed)

Robotic microwave digestion

- Nitric acid
- Hydrochloric acid
- Hydrogen peroxide

Liquified samples are 'sipped'
into the ICP-MS and analyzed

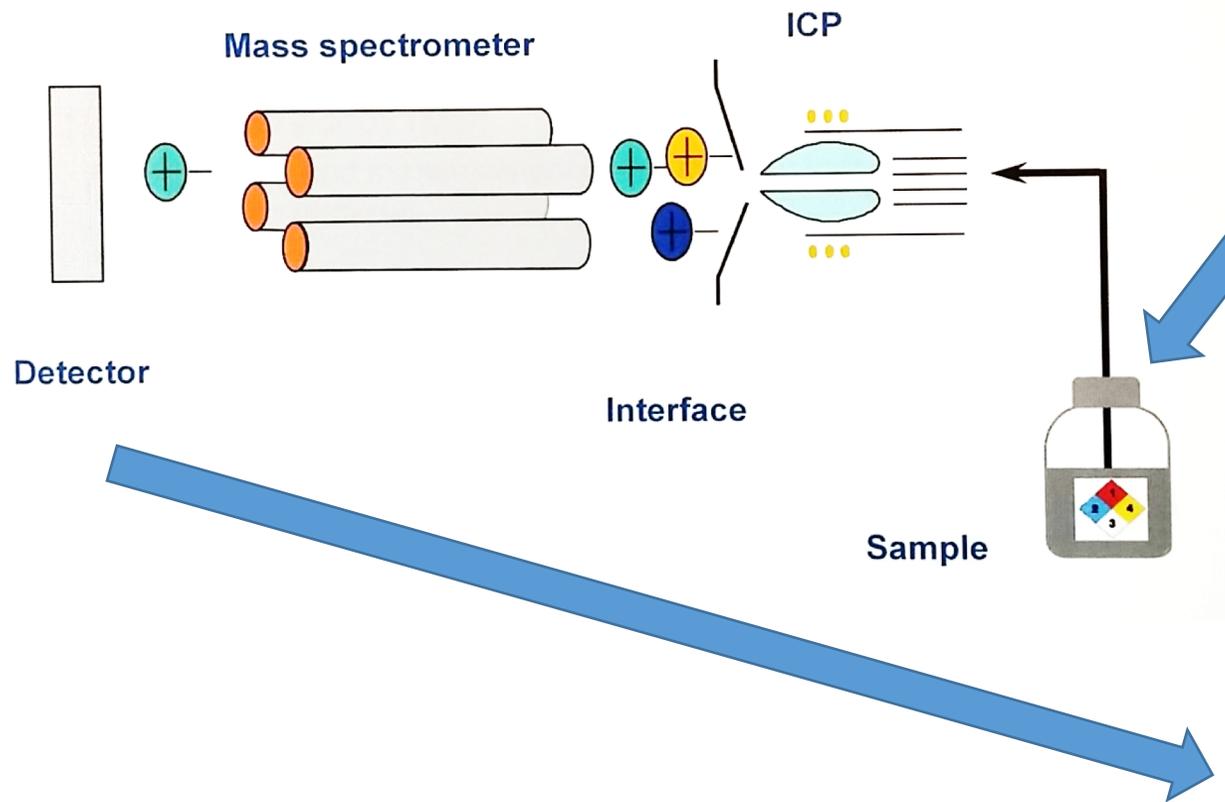


What changed? Instrumentation

- Previously Flame or Graphite Furnace Atomic Absorption
 - Limited to a single metal/element per run
 - Energy-based (light wavelength)
- NEW Equipment : ICP-MS
 - Inductively Coupled Plasma – Mass Spectrometry
 - Simultaneous analysis for multiple metals/elements
 - Automated data analysis
 - Mass-based



How ICP-MS works



Elements analyzed by ICP-MS

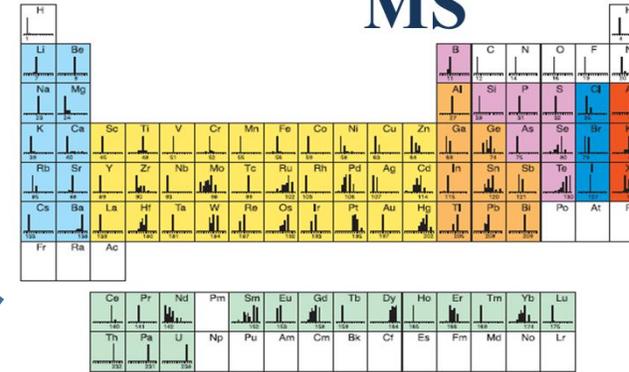
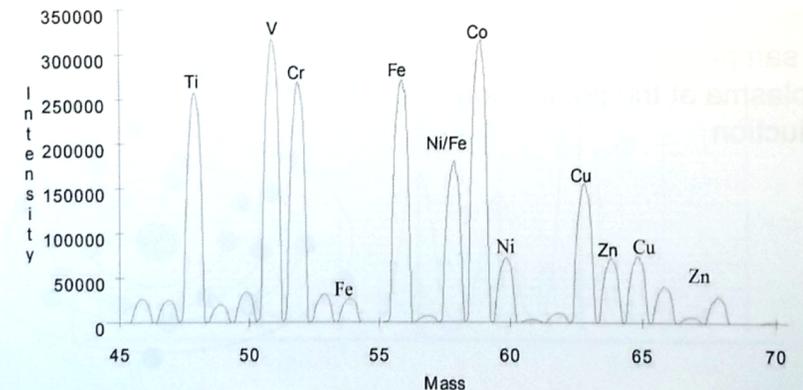


Figure 1. Elements analyzed by ICP-MS (in color).



- ▶ A series of peaks that correspond to mass to charge ratio (m/z)
- ▶ Peaks could be the sum of different isotopes of different elements
- ▶ Doubly charged ions will appear 1/2 its mass
- ▶ Molecular overlaps possible



Coming Soon: Serum and Blood Analyses

Future clinical nutritional panel:

Cobalt (Co)
Copper (Cu)
Iron (Fe)
Manganese (Mn)
Molybdenum (Mo)
Selenium (Se)
Zinc (Zn)

Panel Pricing: TBD

Single metal price: TBD

TAT, standard: 3 days

STAT option: 1 day, for 50% more

Sample requirements:

Serum in royal blue for good Zinc**
Serum (red-top, tiger-top, yellow-top)
Whole blood (EDTA or heparin)

**Plastic tubes can be used to avoid rubber stoppers and potential Zinc contamination



Watch our website for more
information coming soon!
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