

Bioanalytical Toolbox for Fish Health and Environmental Monitoring

GENE EXPRESSION ANALYSIS



CARO Analytical in partnership with University of Alberta are excited to offer cutting edge toxicity testing

Significantly expands the depth and relevance of regulated Rainbow Trout assays using gene expression analysis

Provides effective and reliable early markers for risk levels; contaminant stress is measured at non-lethal concentrations

Allows for on-site system process adjustments to prevent regulatory compliance failures



Report Output

| Gene | PrimerName | ProductSize (bp) | Sequence |
|--------------|---------------------------|------------------|----------------------------------------------|
| IL-1 β | omIL-1ba_Fw omIL-ba_Rv | 133 | GAAGGCTCTGTCCGAGTTCA TGTGTGATTTGAGCCTCTGG |



Protein rendering using PyMOL

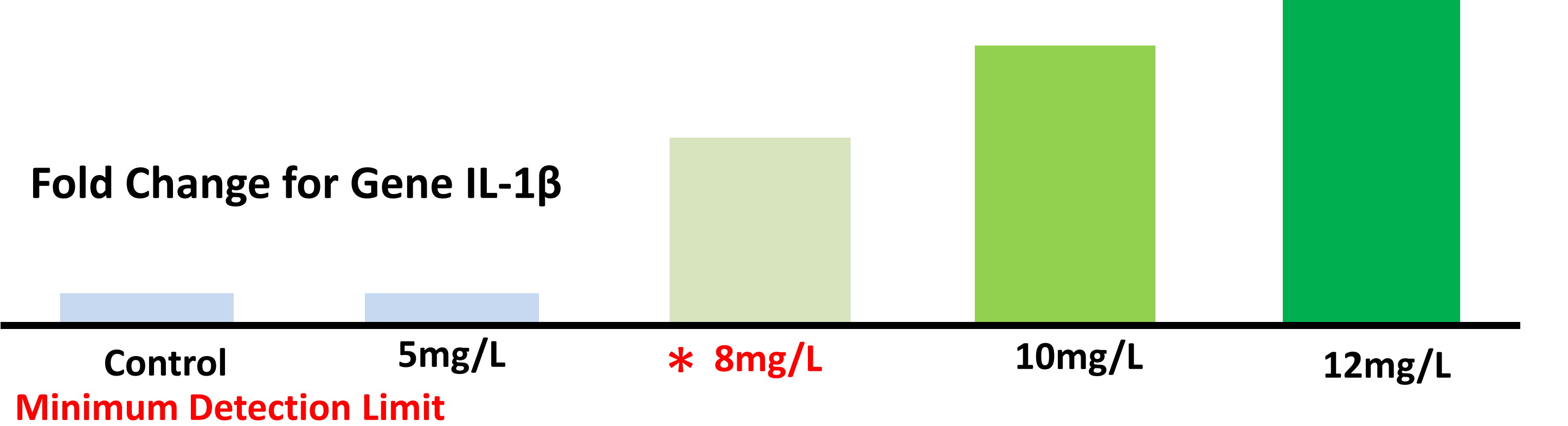
Gene markers provide earlier identifiers of risk compared to current methods

Offers valuable monitoring tool for on-site risk assessment

● Current : Trout Acute Lethality

| Treatment Concentration | Number of Fish | Mortality |
|-------------------------|----------------|-----------|
| Control (<0.1mg/L) | 10 | 0% |
| 5mg/L | 10 | 0% |
| 8mg/L | 10 | 0% |
| * 10mg/L | 10 | 20% |
| 12mg/L | 10 | 80% |

● New Bioanalytical approach

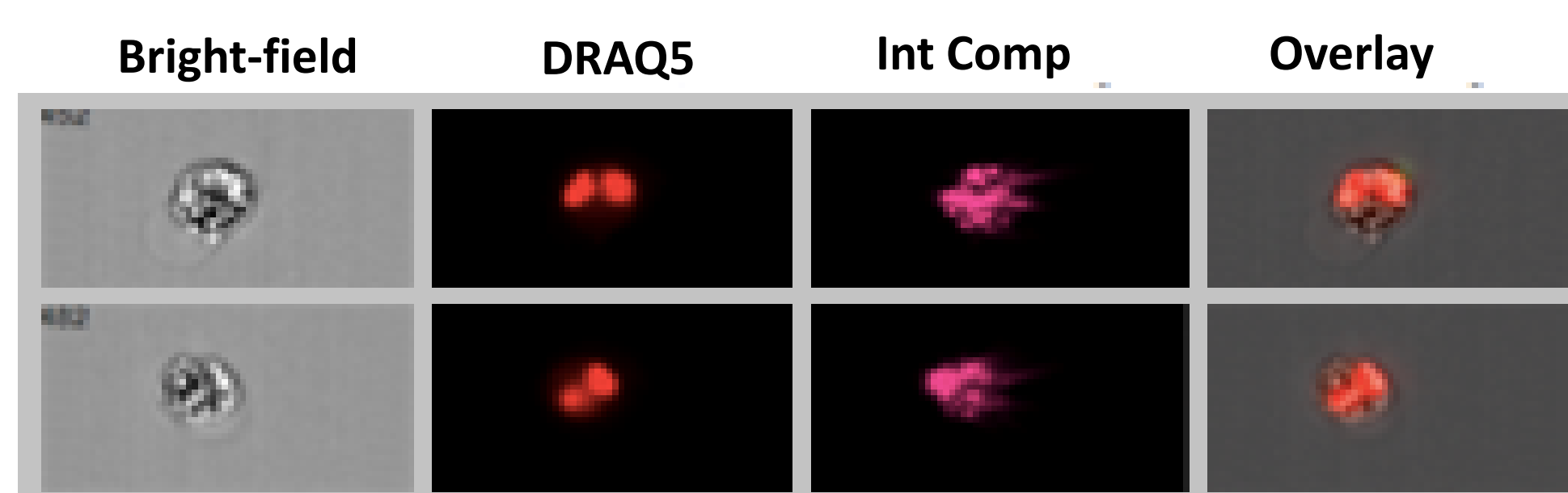
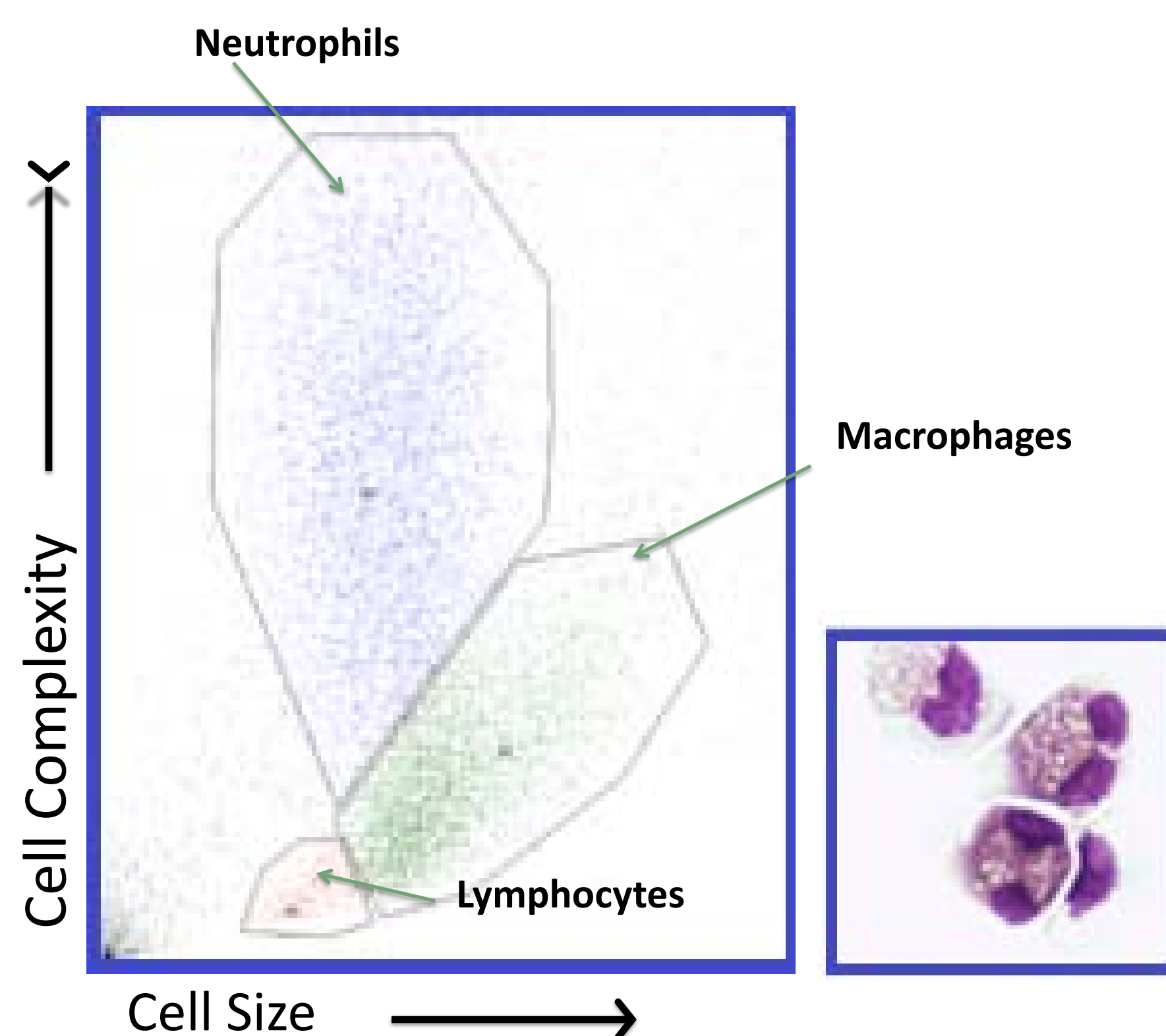


IMMUNE RESPONSE ANALYSIS

Functional immune system parameters are used to evaluate site conditions and assess changes to health status

Moves beyond individual contaminants to capture combinatorial effects in complex water mixtures

Potential to reduce monitoring time as toxicant mitigation supported for regulatory sign off



Increased certainty and due diligence for remediation after contaminant release events

Added depth and robustness provided by functional cellular applications

Efficient response and resolution of an immune challenge is used to offer key outputs for animal health

