Docket #: S18-559

Biomarkers Differentiate Types of Uveitis

Stanford researchers in Dr. Mahajan's laboratory have discovered biomarkers to differentiate between infectious (endophthalmitis) and non-infectious uveitis; and, to accurately categorize the types of infectious uveitis. With these biomarkers, a more efficient and reliable approach compared to conventional methods (mainly clinical findings and gram stains/cultures) can be used to treat uveitis caused by bacteria, viruses, fungi, helminths, or parasites. Instead of waiting days or weeks for laboratory results to determine microbial content, use of biomarkers to identify the etiology of uveitis is faster, more accurate, and more reliable. Particularly in ocular inflammatory cases, waiting for the correct diagnosis and treatment (50% of cases are idiopathic) can cause visual impairment, and ultimately blindness due to the recurrent and chronic nature of the disease process. Proteomic analysis was used to characterize the molecular profiles of the inflamed vitreous by taking biopsies from patients with various vitreoretinal diseases. This technique allowed researchers to identify characteristic protein signatures relating to infectious endophthalmitis and non-infectious uveitis in a mass spectrometry-based screen.

Figure

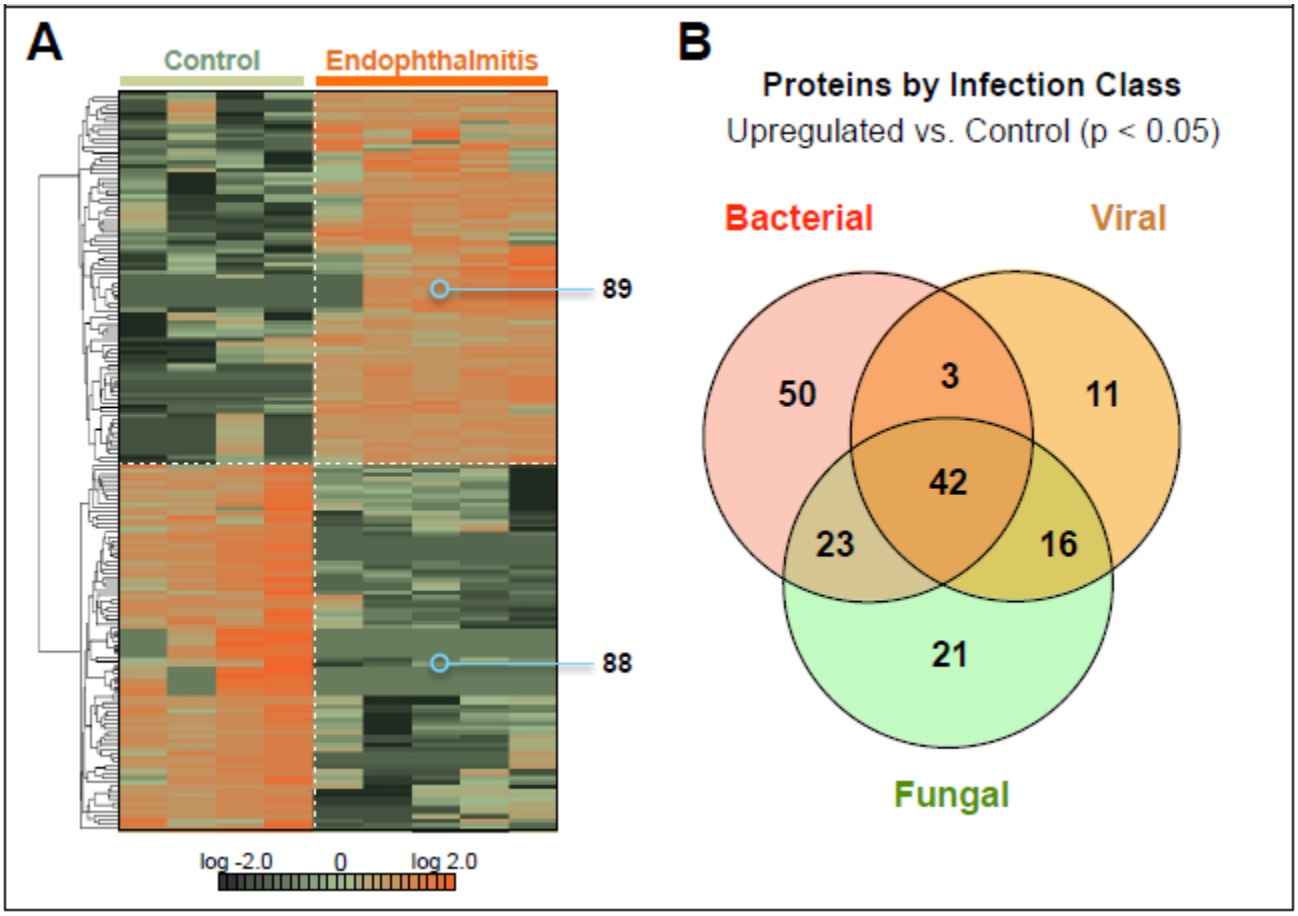


Figure Description: Proteomic profiles differ between classes of infectious endophthalmitis: (A) Hierarchal clustering of proteins differentially expressed in our infectious endophthalmitis samples (all classes) compared to normal controls (ERM). Results are represented as a heatmap and display protein expression levels on a logarithmic scale. Orange = high expression. Dark green/black = low or no expression. A total of 89 proteins were upregulated and a total of 88 proteins were downregulated (p 0.05). (B) Protein signatures were categorized by infection class (bacterial, viral, and fungal) and further analyzed by comparative Venn diagram analysis.

Stage of Development

Protein biomarkers are now being validated in a custom multiplex ELISA array

Applications

- Diagnosis of the etiology of infectious uveitis whether it is due to bacteria, viruses, fungi, helminths, or parasites so treatment can be expedited

- Infectious endophthalmitis and non-infectious uveitis

Advantages

- **Fast results** – Do not have to wait days to weeks for laboratory culture. If doctors are unable to treat the inflammation quickly, visual morbidity and blindness are likely
- **Accurate** – Identified biomarkers target disease process with precision. Current retrieval of ocular fluid samples via gram stains and cultures are often unreliable or of low yield
- **Unmet medical need** – No other biomarkers for uveitis for therapeutic use. There is a strong need to develop rapid and precise diagnostic tools for infectious endophthalmitis
- **Swift diagnosis**-- 50% of posterior uveitis cases are considered "idiopathic." An initial diagnostic hurdle is determining whether the cause of inflammation is due to an infection (endophthalmitis) or an autoimmune response

Patents

- Published Application: WO2021061980
- Published Application: 20220404373
- Issued: 12,631,653 (USA)

Innovators

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