

Název: CombiMatrix ElectraSense™: The electrochemistry method for identification influenza viruses.

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## CombiMatrix ElectroSense™: Microarray

MicroArray is a new technology to show the expression of genes.

MicroArray is a hybridization of a nucleic acid sample (target) to a very large set of oligonucleotide probes inside on the chip.



Array Reader

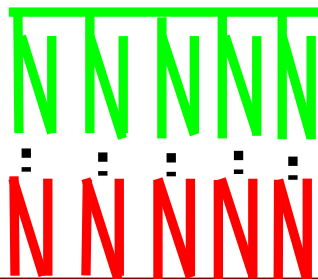


Chip

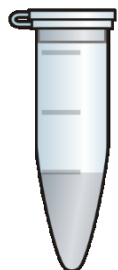
## CombiMatrix ElectroSense™: Microarray and hybridization



Surface of chip



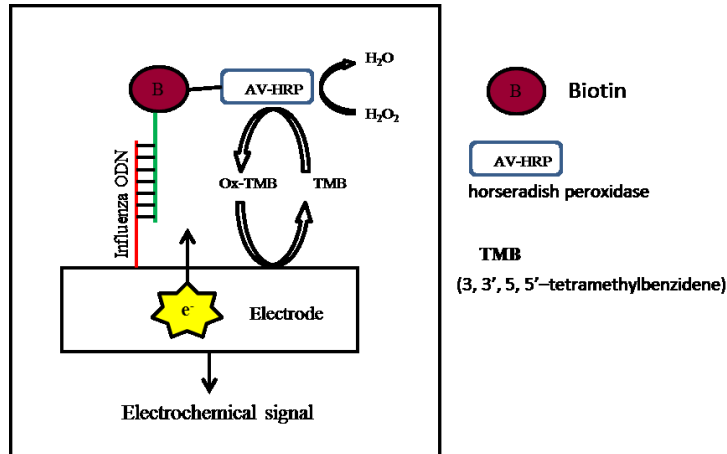
Oligonucleotides probes of influenza viruses inside of the chip



Samples of RNA Influenza viruses



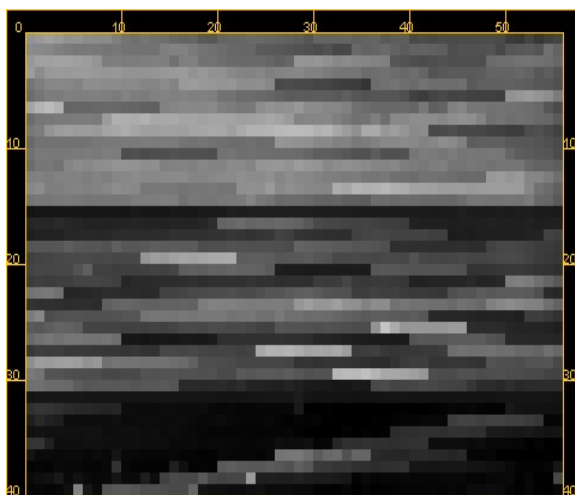
## CombiMatrix ElectroSense™: Electrochemical detection



- The approach is based on the detection of redox active chemistries (such as horseradish peroxidase (HRP) and the associated substrate TMB) proximal to specific microarray electrodes.
- Microarray probes are hybridized to biotin-labeled targets.
- The HRP-streptavidin conjugate binds to biotin, and enzymatic oxidation of the electron donor substrate then occurs.
- The detection current is generated due to electro-reduction of the HRP reaction product, and it is measured with the CombiMatrix ElectroSense™ Reader.

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# CombiMatrix ElectroSense™: Results



Y-axis	Y-axis	Y-axis	Y-axis	Y-axis
0	10	20	30	40
50	60	70	80	90

Reg.č.projektu: CZ.1.07/2.4.00/31.0023

Název projektu: Partnerská síť centra excelentního bionanotechnologického výzkumu

## CombiMatrix ElectroSense™: Review of Results

Kristian M. Roth et al, demonstrated very good detection of avian influenza subtype H5N1 by application of electrochemical detection of CombiMatrix microarrays



### Electrochemical Detection of Short DNA Oligomer Hybridization Using the CombiMatrix ElectroSense Microarray Reader

Kristian M. Roth,\* Kia Peyvan, Kevin R. Schwarzkopf, Andrei Ghindilis

CombiMatrix Corp., 6500 Harbour Heights Pkwy Mukilteo, WA 98275

\*e-mail: kroth@combimatrix.com

Michael J. Lodes et al, identified of upper respiratory tract pathogens by electrochemical detection on an oligonucleotide microarray, including A and B influenza viruses



### Identification of Upper Respiratory Tract Pathogens Using Electrochemical Detection on an Oligonucleotide Microarray

Michael J. Lodes<sup>1\*</sup>, Dominic Suci<sup>1</sup>, Jodi L. Wilmoth<sup>1</sup>, Marty Ross<sup>1</sup>, Sandra Munro<sup>1</sup>, Kim Dix<sup>1</sup>, Karen Bernards<sup>1</sup>, Axel G. Stöver<sup>1</sup>, Miguel Quintana<sup>2</sup>, Naomi Iihoshi<sup>2</sup>, Wanda J. Lyon<sup>3</sup>, David L. Danley<sup>1</sup>, Andrew McShea<sup>1</sup>

<sup>1</sup> CombiMatrix Corporation, Mukilteo, Washington, United States of America, <sup>2</sup> United States Army Center for Health Promotion and Preventive Medicine-West, Fort Lewis, Washington, United States of America, <sup>3</sup> Air Force Research Laboratory/Human Effectiveness Directorate, Applied Biotechnology Branch, Wright-Patterson Air Force Base, Ohio, United States of America

## CombiMatrix ElectroSense™: Review of Results

*Shelly Bolotin et al*, showed that the sensitivity of the CombiMatrix influenza detection system was 95.2% and the specificity was 100% for influenza A subtype during the 2007–2008 influenza season in Toronto, Canada

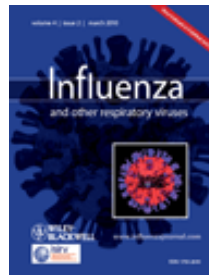


VIROLOGY JOURNAL

**Verification of the Combimatrix influenza detection assay for the detection of influenza A subtype during the 2007–2008 influenza season in Toronto, Canada**

Shelly Bolotin\*<sup>1</sup>, Ernesto Lombos<sup>1</sup>, Rani Yeung<sup>1</sup>, AliReza Eshaghi<sup>1</sup>,  
Joanne Blair<sup>1</sup> and Steven J Drews<sup>1,2,3</sup>

*Straight, T.M. et al*, correctly identified 23 of 24 samples of laboratory-confirmed pandemic (H1N1) 2009 Influenza by the ElectroSense Influenza A assay.



**A novel electrochemical device to differentiate pandemic (H1N1) 2009 from seasonal influenza**

T. M. Straight<sup>1</sup>, G. Merrill<sup>1</sup>, L. Perez<sup>1</sup>, J. Livezey<sup>1</sup>,  
B. Robinson<sup>1</sup>, M. Lodes<sup>2</sup>, D. Suci<sup>2</sup>, B. Anderson<sup>2</sup>



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## CombiMatrix ElectroSense™: Conclusions

The CombiMatrix influenza detection system is an effective methodology for influenza A and B subtype analysis

Rapid identification pathogens will significantly decrease the time and cost for the identification of potential lethal virus and bacterial strains and lead to better treatment and management of infections

Microarray and biosensor technologies show great promise for virus and bacteria detection and genotyping and are needed for rapid effective treatment, environmental monitoring and the detection of bioterrorism agents.



# Thank you for your attention!



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