Virus Detection by On-chip Hydroxyapatite Chromatography

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1. Background

New Virus Infection

Virus Isolation by Hydroxyapatite (HA) Chromatography

Poor sanitation
Scarce tools

High-resolution
Device Size & Cost

2. Concept: On-chip HA Chromatography

Switching Valve
Column
Inlet 1 (HA)
Drain

Inlet 2 (Sample, Elution Buffer)

Flow

Micro Pillar

V₁L : On
V₄R : Off

V₄L : Off
V₄R : On

3. Experiment & Result

Virus Isolation for Accurate Detection

1. Introduce a NDV (Newcastle Disease Virus) suspension which included FBS (Fetal bovine serum) proteins
2. Introduce 500 mM KCl to elute the FBS proteins
3. Introduce 1 M PB (Phosphate buffer) to elute the NDVs
4. Hemagglutination Reaction

Success of Virus Detection

Virus Enrichment for Early Detection

1. Introduce 1000 µL of 10⁴ pfu/mL NDV suspension
2. Introduce 100 µL of 1 M PB to elute NDVs
3. Hemagglutination Reaction

4. Conclusions

1. HA chromatography was carried out in a microfluidic chip.
2. NDVs were successfully isolated from the suspension containing 5 %, 10 %, 15 %, 20 % FBS by HA chromatography.
3. NDVs were successfully 8 times enriched.
4. Therefore, the sensitivity of virus detection was improved by on-chip HA chromatography.

References