マイクロカラムを有するマイクロ流体チップを用いたウイルス核酸抽出

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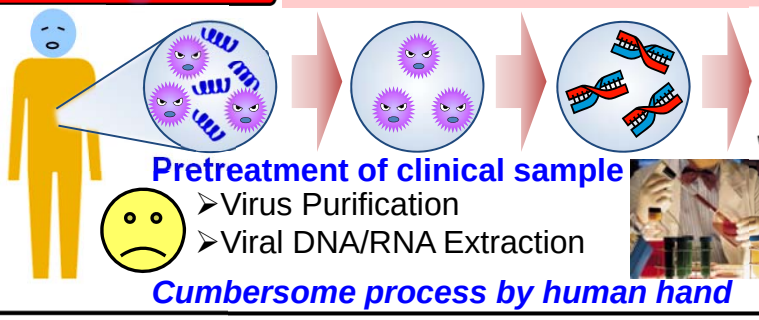
ウイルスをワンチップで検出する！！

1.Background

Gene Analysis of Infectious Viruses



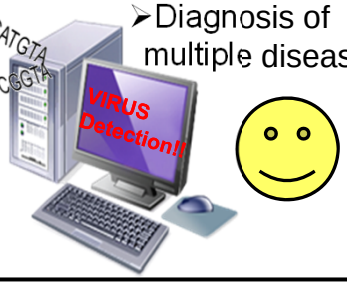
Pretreatment of clinical sample

- Virus Purification
- Viral DNA/RNA Extraction

Cumbersome process by human hand

DNA Sequencer

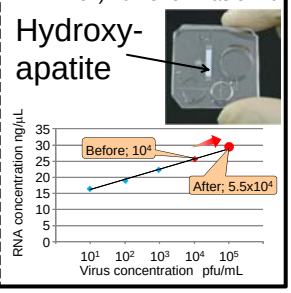
- High throughput
- Diagnosis of multiple diseases



Virus Purification

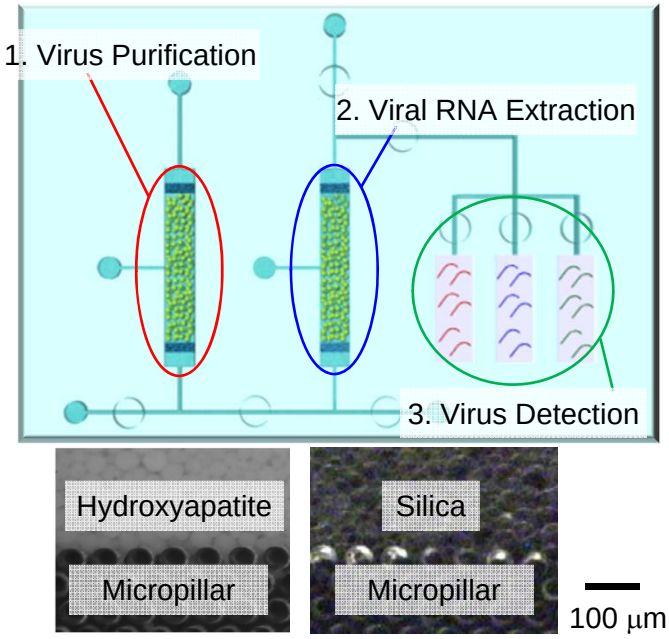
Ref.) 26th Cheminas 3P16

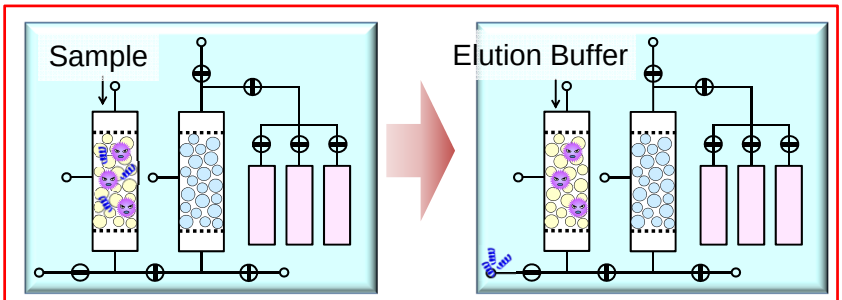
Hydroxy-apatite



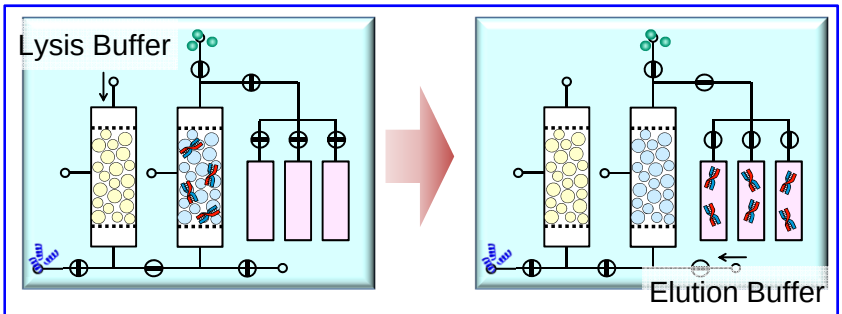
2. Concept

Microfluidic chip for Pretreatment of sample





1. Virus Purification by Hydroxyapatite-packed Microcolumn

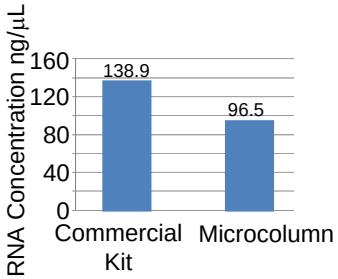


2. Viral RNA Extraction by Silica-packed Microcolumn

3. Result

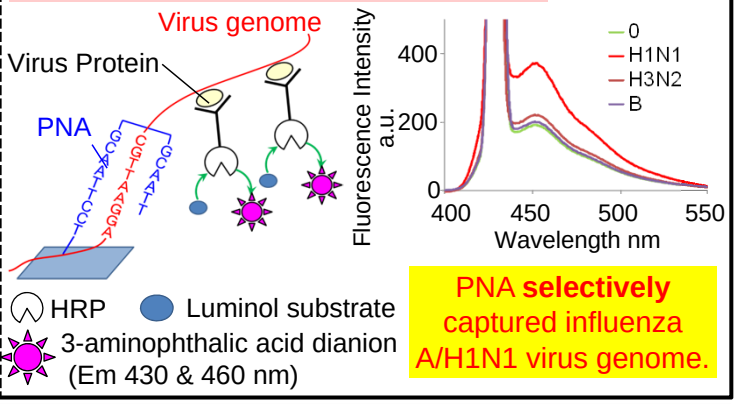
RNA Extraction by Silica-packed Microcolumn

1. Lyse the NDVs (Newcastle Disease Viruses).
2. Introduce the lysate into the microclumn. The viral RNA is adsorbed onto the silica.
3. Introduce the elution buffer into the microcolumn to elute the viral RNA.



70 % of viral RNA was extracted by the microcolumn.

Viral RNA Detection by PNA



PNA selectively captured influenza A/H1N1 virus genome.

4. Conclusion

- All pretreatment processes for viral gene analysis can be completed **in one chip**.
- **In situ virus detection will be possible by anybody, anywhere and anytime.**

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Reference：
1. 新美京，益田泰輔，開發邦宏，加藤修雄，中村昇太，中屋隆明，新井史人，“マイクロカラムを有するマイクロ流体チップを用いたウイルス核酸抽出”，27th CHEMINAS 講演要旨集 p.7，2013
2. M. Niimi, et. al., “Virus Detection by On-chip Hydroxyapatite Chromatography”, 16th International Conference on Miniaturized Systems for Chemistry and Life Sciences (Micro TAS 2012), pp. 605-607, 2012