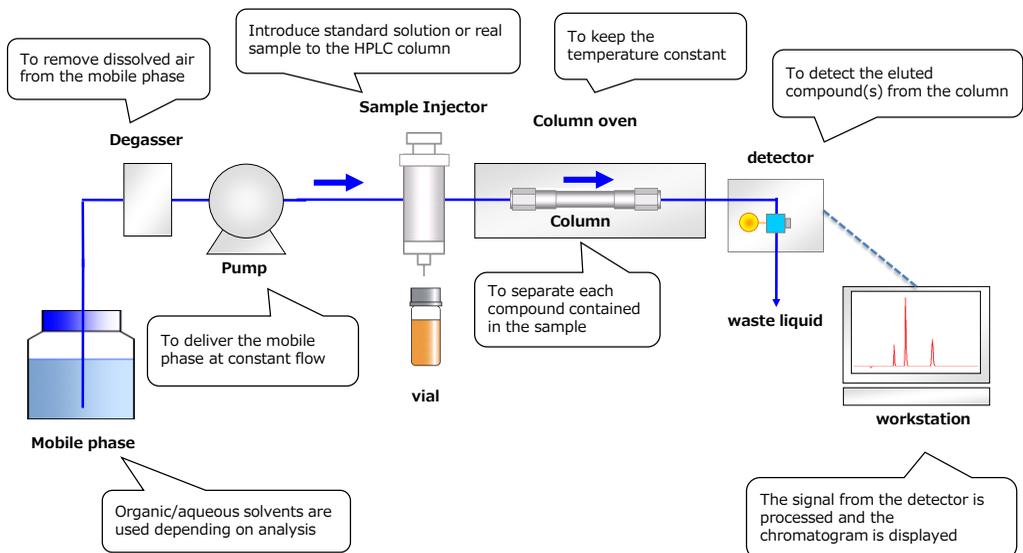


# Fundamentals of HPLC

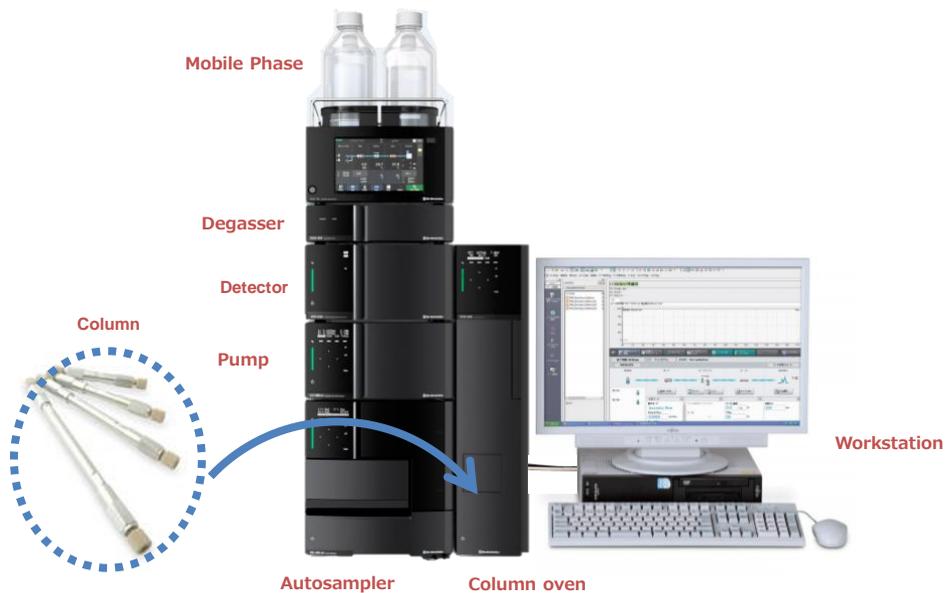
## 3 \_ Apparatus constituting HPLC (1)

Shimadzu Corporation  
Analysis and Measurement Division  
Global Application Development Center  
Content : Natsuki Iwata (May,2021)

## Configuration of HPLC system

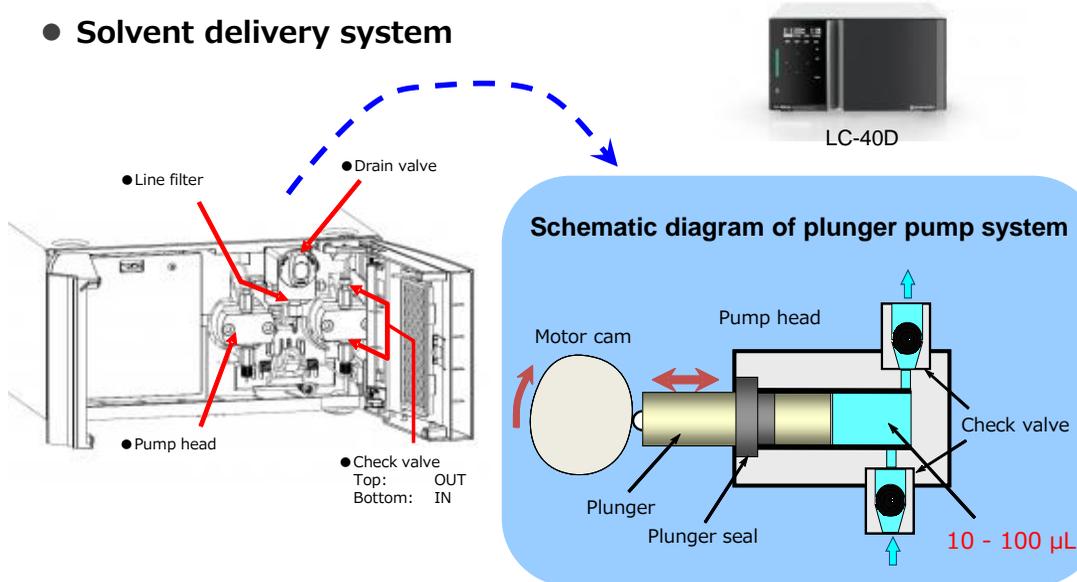


# What does the HPLC system look like?



# Solvent delivery pump

## ● Solvent delivery system



## Isocratic elution and gradient elution

- **Isocratic elution**

- Method with a mobile phase of constant composition
- Useful for analyzing one compound or several compounds that have similar retentions

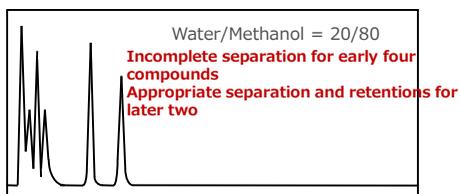
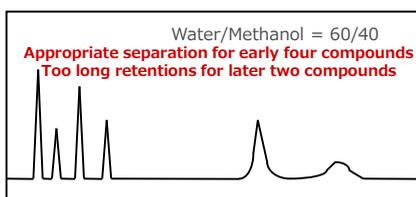
- **Gradient elution**

- Method with two or more components in a mobile phase and its composition is being changed depending on analysis time
- Useful for simultaneous analysis of compounds that have wide range of retentions

## Effect of gradient elution

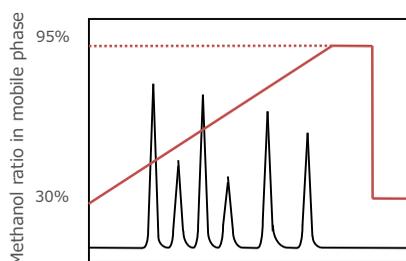
- **Separation efficiency**

- **With isocratic elution . . .**



- **With gradient elution . . .**

Changing mobile phase composition  
depending on analysis time



Shorter analysis time with appropriate separation

(In case of reversed-phase chromatography)

## Sample injection

- **Manual injector**

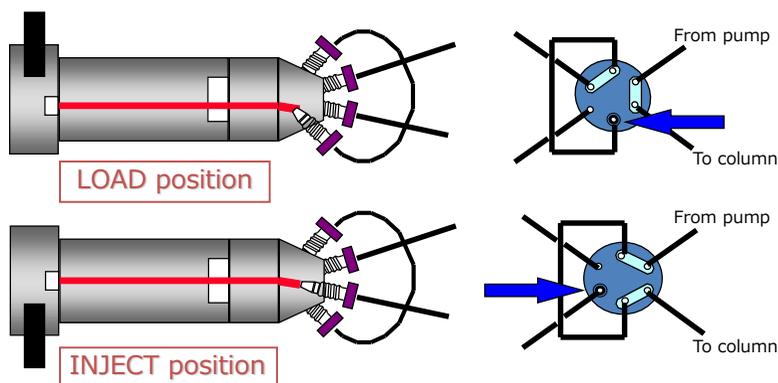
- Apparatus for **manually** introducing a sample into a column
- Syringe (1 to 50  $\mu\text{L}$ ) is used to introduce a sample
- Accurate injection volume and timing could be difficult

- **Autosampler**

- Apparatus for **automatically** introducing a sample into a column
- It repeatedly introduces samples set in autosampler
- It allows to inject samples precisely at the identical interval set by method and this accuracy is necessary for gradient elution

## Manual injector

- Apparatus for **manually** introducing sample into column

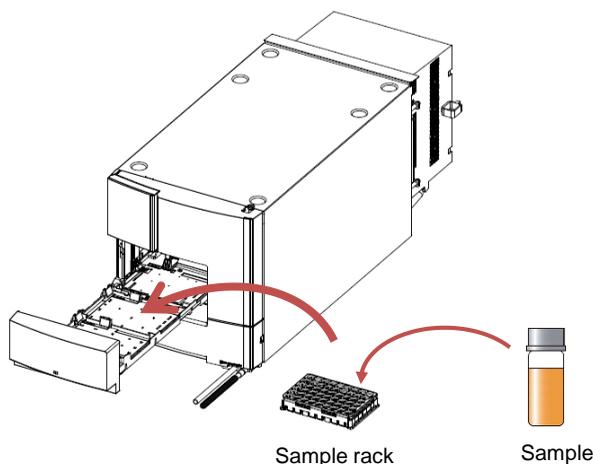


# Autosampler

- Apparatus for **automatically** introducing sample into column



SIL-40CXR



Sample rack

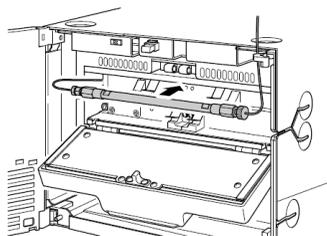
Sample

# Column oven

- Apparatus for keeping column temperature constant

- Block Heater Type

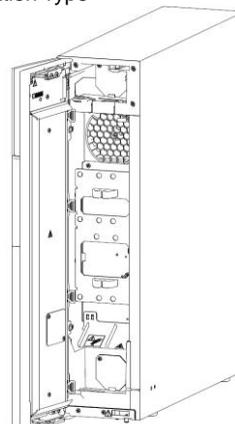
- Air Circulation Type



CTO-30A



CTO-40S



Thank you for your attention.

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