

KBIOHEALTH-Ver.202511-01

[AI · 바이오 융합 기본과정] Alphagenome 실습을 위한 환경 세팅 가이드

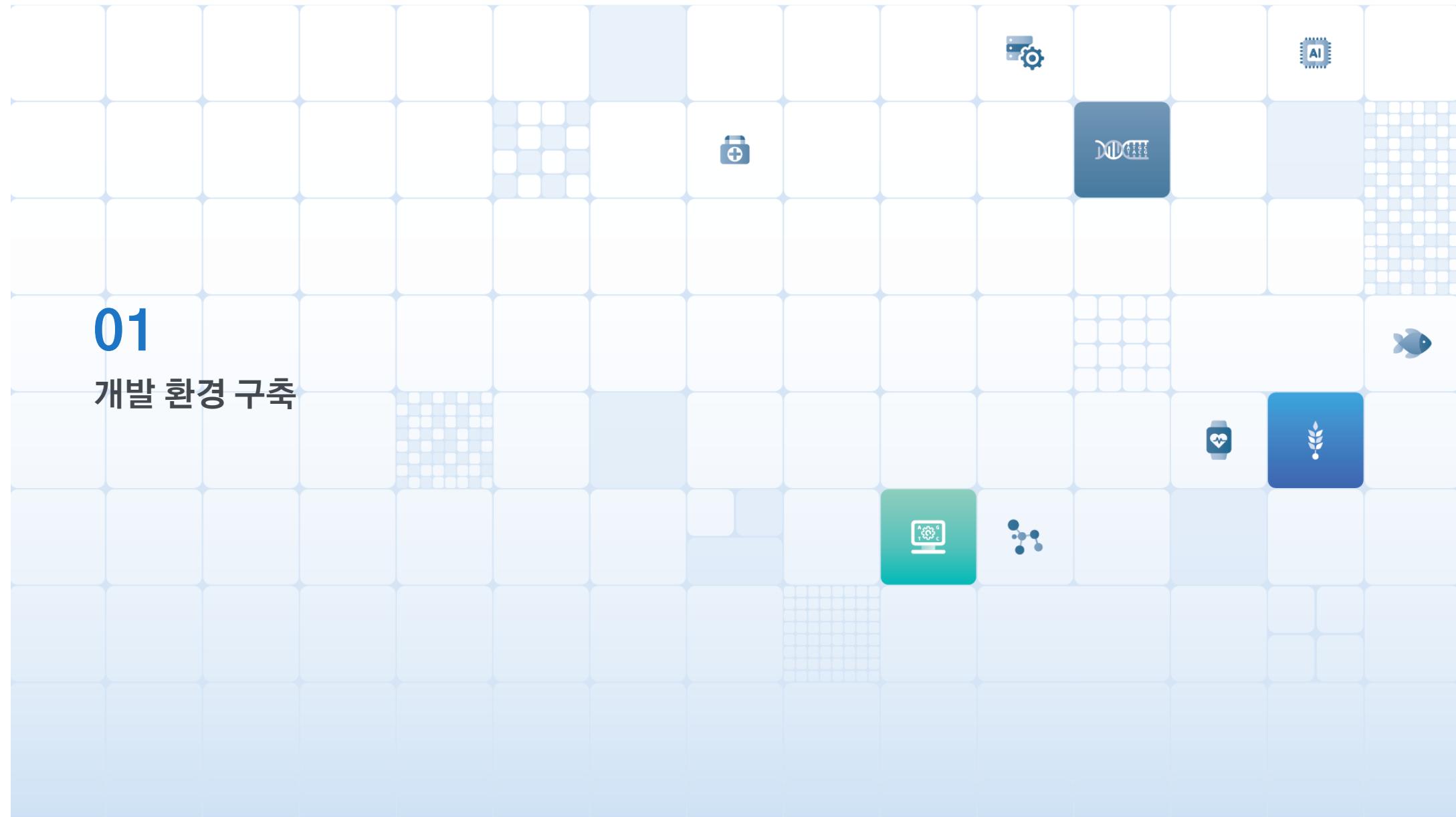
2025-11-27 (주)인실리코젠

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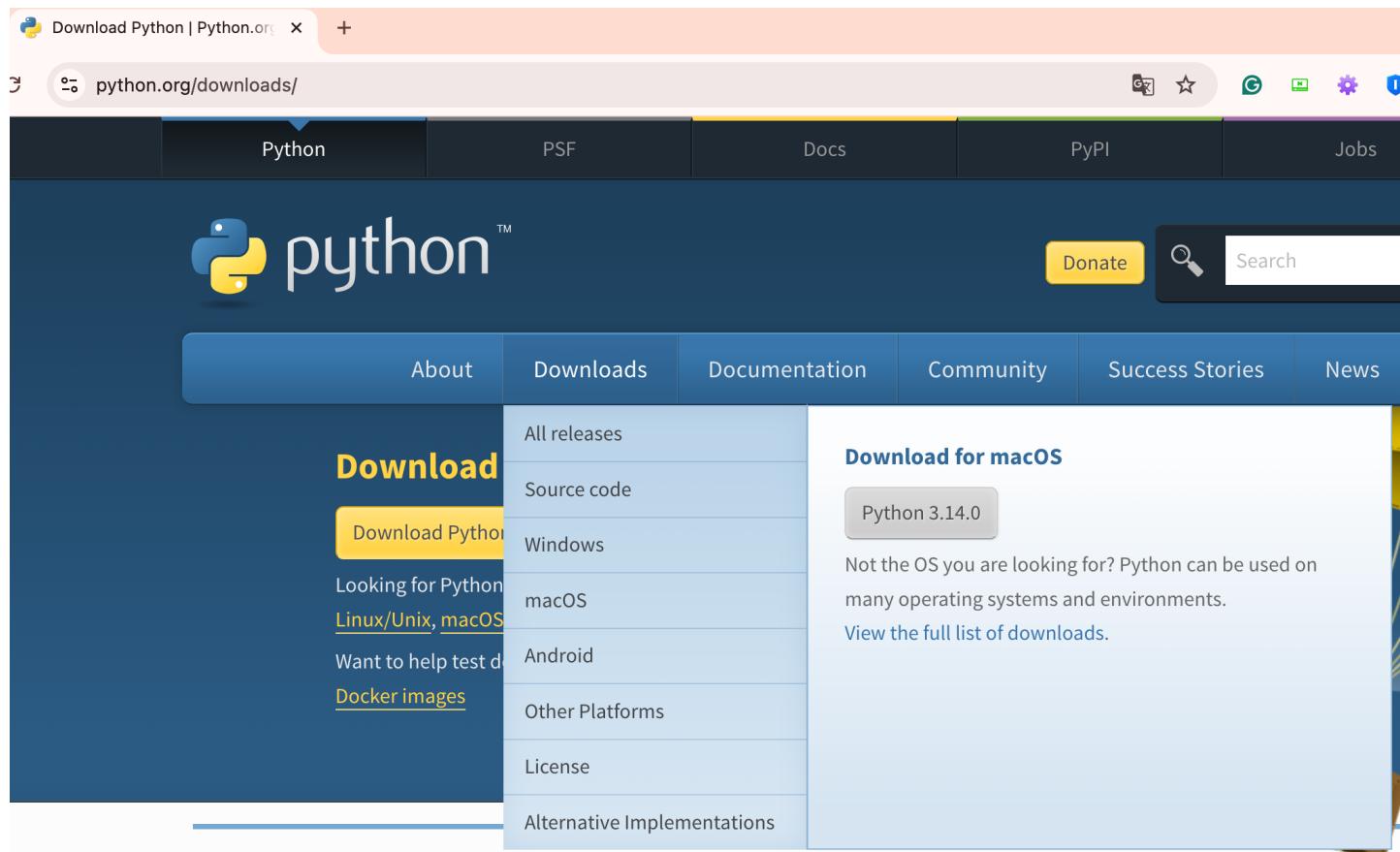
01

개발 환경 구축



개발 환경 구축

python설치: <https://www.python.org/downloads/>



<https://wikidocs.net/8>

개발 환경 구축

Git 설치 (Windows), mac은 기본 제공

1

Google

git 설치

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AI 모드 전체 이미지 동영상 쇼핑 뉴스 짧은 동영상 더보기 ▾ 도구 ▾

See detailed insights & Compare multiple related Papers for : “git 설치”

Compare insights ↗

2

Git

https://git-scm.com › book › 시작하기-Git-설치 :

Git 설치

Windows에 Git을 설치하는 방법은 여러 가지다. 공식 배포판은 Git 웹사이트에서 내려받을 수 있다. http://git-scm.com/download/win에 가면 자동으로 다운로드가 시작 ...

개발 환경 구축

Git 설치 (Windows), macOS 기본 제공

1

Windows에 설치

Windows에 Git을 설치하는 방법은 여러 가지다. 공식 배포판은 Git 웹사이트에서 내려받을 수 있다. <http://git-scm.com/download/win>에 가면 자동으로 다운로드가 시작된다. 이 프로젝트가 'Git for Windows'인데, Git 자체와는 다른 별도의 프로젝트다. 자세한 정보는 <https://git-for-windows.github.io/>에서 확인한다.

자동화된 설치 방식은 [Git Chocolatey 패키지](#)를 통해 이용해볼 수 있다. 패키지는 커뮤니티에 의해 운영되는 프로그램인 점을 알려드린다.

Windows에서도 Git을 사용하는 또 다른 방법으로 'GitHub Desktop'을 설치하는 방법이 있다. 이 인스톨러는 CLI와 GUI를 모두 설치해준다. 설치하면 Git을 Powershell에서 사용할 수 있다. 인증정보(Credential) 캐싱과 CRLF 설정까지 잘 된다. 이런 것들은 차차 배우게 될 것인데, Git 사용자라면 쓰게 될 기능들이다. 'GitHub Desktop'은 [GitHub Desktop 웹사이트](#)에서 내려받는다.

Install

Latest version: 2.52.0 ([Release Notes](#))

2

[Windows](#) [macOS](#) [Linux](#) [Build from Source](#)

[Click here to download](#) the latest (2.52.0) x64 version of **Git for Windows**. This is the most recent [maintained build](#). It was released **10 days ago**, on 2025-11-17.

개발 환경 구축

vscode 설치

1

Google

vscode 설치

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Compare insights ↗

2

Visual Studio Code
<https://code.visualstudio.com> › download :

Download Visual Studio Code - Mac, Linux, Windows

Visual Studio Code is free and available on your favorite platform - Linux, macOS, and Windows.
Download Visual Studio Code to experience a redefined code ...

Docs Visual Studio Code FAQ Microsoft software license terms

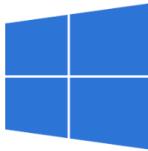
This screenshot shows a Google search results page for the query "vscode 설치". The search bar has a red box around it. Below the search bar, there are various filters like AI mode, full text, video, images, shopping, etc. A callout box highlights a paper titled "vscode 설치" with a "Compare insights" button. The main result is for Visual Studio Code, with its logo and download link. A large blue box highlights the "Download Visual Studio Code - Mac, Linux, Windows" button. Below the button, there's a brief description of the tool and a "Download" link. At the bottom, there are links for "Docs", "Visual Studio Code FAQ", and "Microsoft software license terms".

개발 환경 구축

vscode 설치

Download Visual Studio Code

Free and built on open source. Integrated Git, debugging and extensions.



↓ Windows

Windows 10, 11

User Installer x64 Arm64

System Installer x64 Arm64

.zip x64 Arm64

CLI x64 Arm64



↓ .deb

Debian, Ubuntu

↓ .rpm

Red Hat, Fedora, SUSE



↓ Mac

macOS 11.0+

.deb x64 Arm32 Arm64

.rpm x64 Arm32 Arm64

.tar.gz x64 Arm32 Arm64

Snap Snap Store

CLI x64 Arm32 Arm64

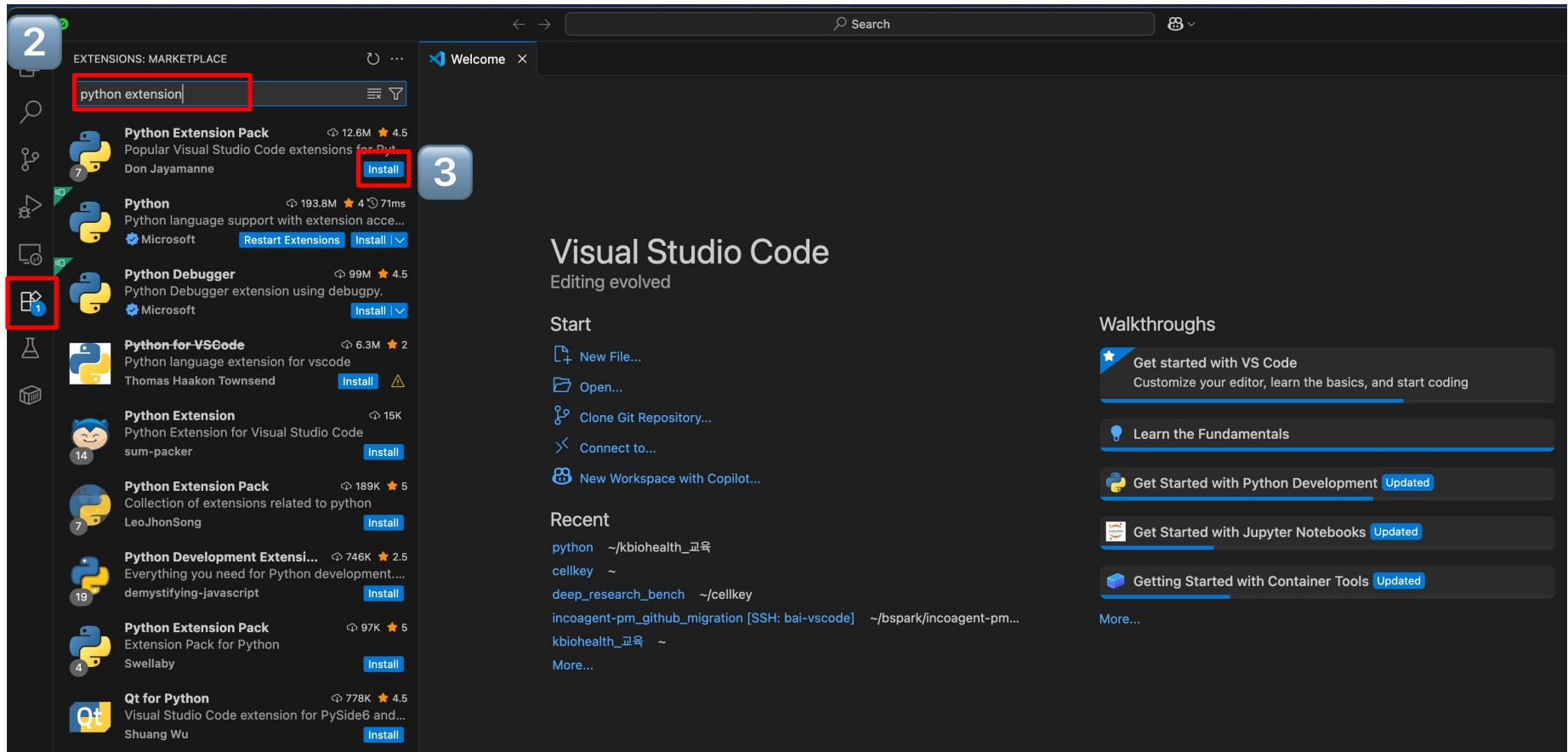
.zip Intel chip Apple silicon Universal

CLI Intel chip Apple silicon

운영체제에 맞게 선택!

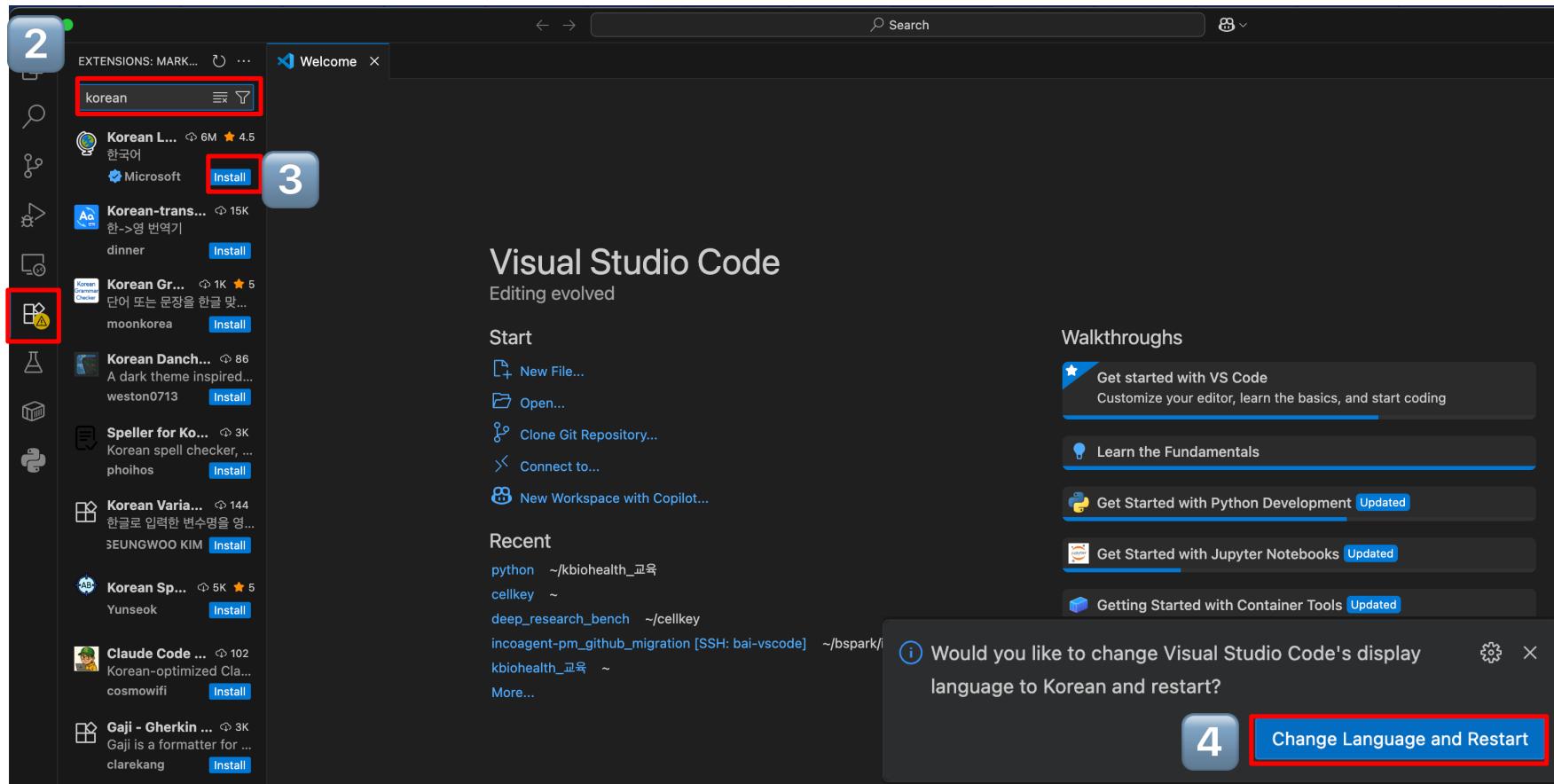
개발 환경 구축

vscode extension 설치



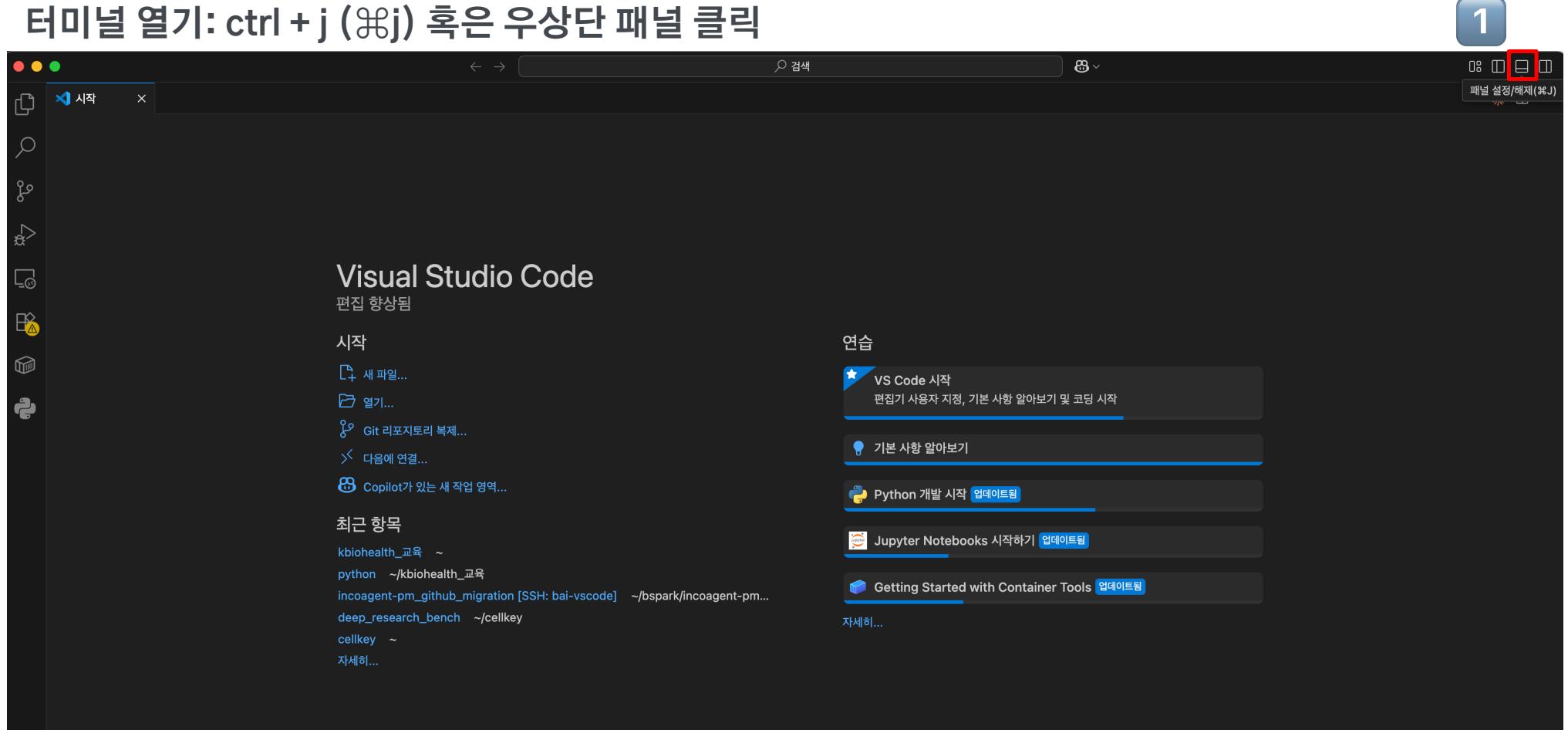
개발 환경 구축

vscode extension 설치



개발 환경 구축

터미널 열기: **ctrl + j** (⌘j) 혹은 우상단 패널 클릭



개발 환경 구축

깃헙 저장소 클론 받기

- pwd를 통해 현재 디렉토리 경로 출력, cd를 통해 디렉토리 변경 및 mkdir 활용하여 프로젝트 디렉토리 생성 후 원하는

경로에 git clone

명령어 활용하여

저장소 클론 받기

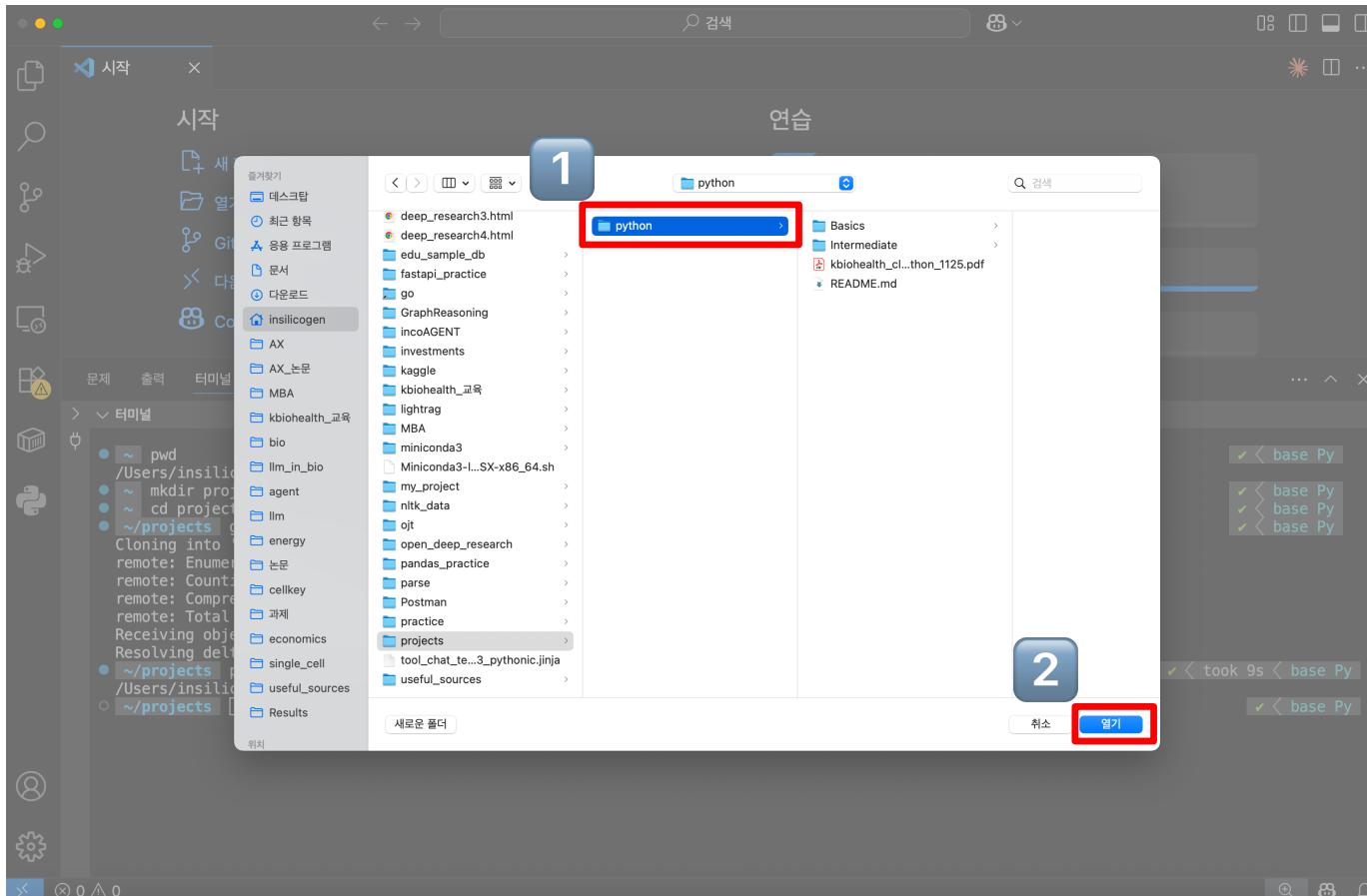
The screenshot shows the VS Code interface with the terminal tab selected. The terminal window displays the following command and its execution:

```
~$ pwd  
/Users/insilicogen  
~$ mkdir projects  
~$ cd projects  
~/projects$ git clone https://github.com/kbio-isg/python.git  
Cloning into 'python'...  
remote: Enumerating objects: 2246, done.  
remote: Counting objects: 100% (24/24), done.  
remote: Compressing objects: 100% (20/20), done.  
remote: Total 2246 (delta 10), reused 5 (delta 4), pack-reused 2222 (from 3)  
Receiving objects: 100% (2246/2246), 80.48 MiB | 10.06 MiB/s, done.  
Resolving deltas: 100% (1096/1096), done.  
~/projects$
```

A red box highlights the terminal output from the git clone command. The status bar at the bottom right indicates "took 9s".

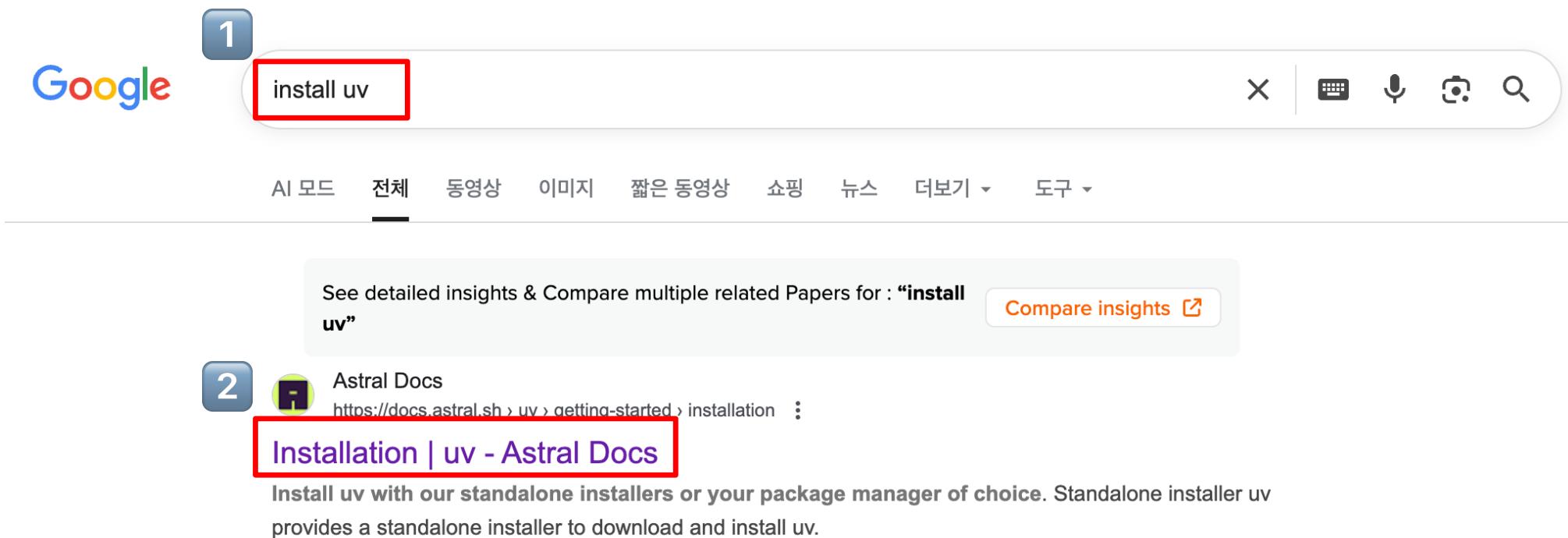
개발 환경 구축

작업 공간 열기: **ctrl + o** (**⌘o**)



개발 환경 구축

uv 설치



개발 환경 구축

uv 설치

Installing uv

Installation methods

Install uv with our standalone installers or your package manager of choice.

- Windows를 사용하더라도 git bash를 사용하기 때문에 macOS and Linux에 있는 명령어를 복사하여 터미널에 붙여넣습니다.

Standalone installer

uv provides a standalone installer to download and install uv:

[macOS and Linux](#) [Windows](#)

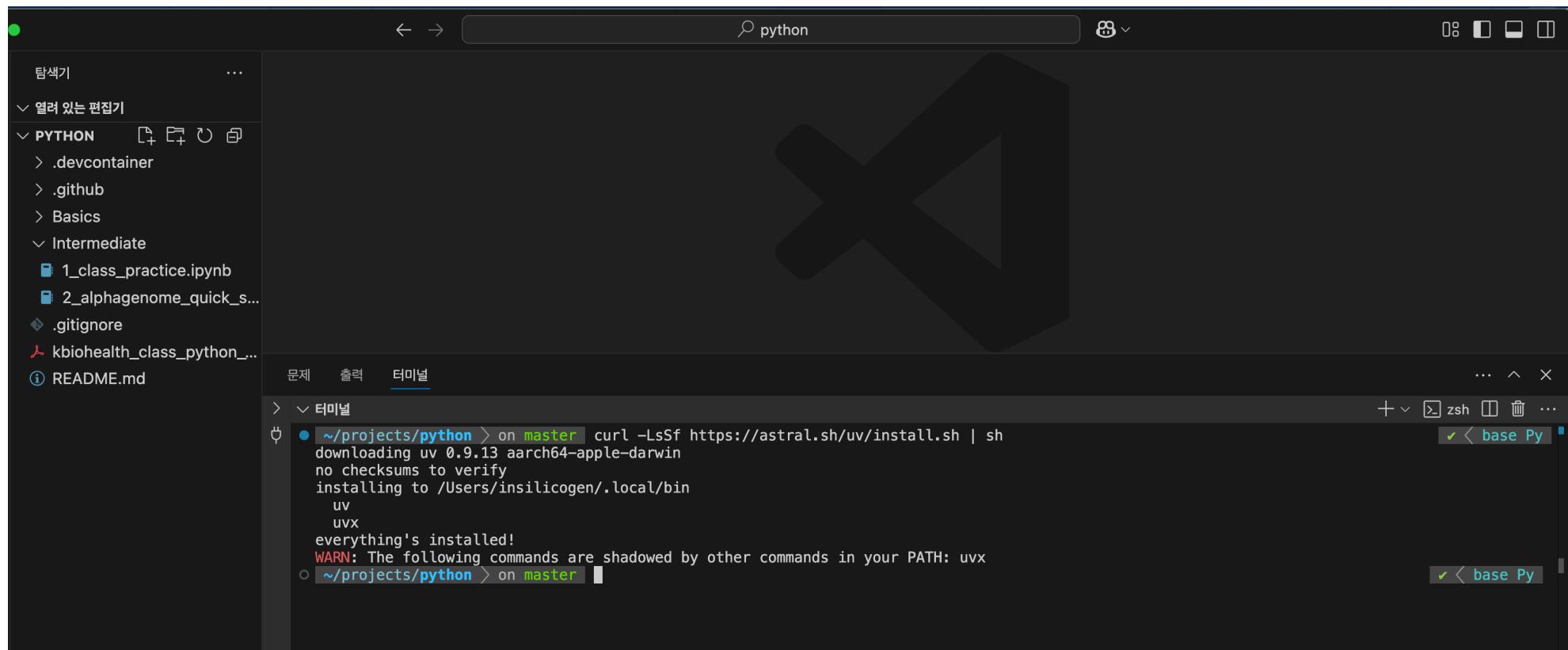
Use `curl` to download the script and execute it with `sh`:

```
$ curl -LsSf https://astral.sh/uv/install.sh | sh
```

개발 환경 구축

uv 설치

- 보통 설치가 1분 내로 빠르게 이루어지기 때문에 그 이상 완료 되지 않으면 ctrl + C를 이용해 중단 후 명령어 재실행



A screenshot of the Visual Studio Code interface. The title bar says "python". The left sidebar shows a file tree with a "PYTHON" folder containing ".devcontainer", ".github", "Basics", "Intermediate", "1_class_practice.ipynb", "2_alphagenome_quick_s...", ".gitignore", "kbiohealth_class_python_...", and "README.md". The main area is a terminal window titled "터미널" (Terminal) with the tab bar set to "터미널". The terminal content shows the following command being run:

```
curl -LsSF https://astral.sh/uv/install.sh | sh
downloading uv 0.9.13 aarch64-apple-darwin
no checksums to verify
installing to /Users/insilicogen/.local/bin
  uv
  uvx
everything's installed!
WARN: The following commands are shadowed by other commands in your PATH: uvx
```

개발 환경 구축

가상 환경 생성: uv venv

- uv venv를 이용해 가상환경을 생성하면 현재 작업 디렉토리에 .venv 폴더 생성

The screenshot shows a dark-themed interface of VS Code. On the left, the Explorer sidebar displays a file tree with a red box highlighting the '.venv' folder under the 'PYTHON' section. The bottom right corner of the sidebar has a small preview of the Python logo. The main workspace shows a terminal window with the following command history:

```
curl -LsF https://astral.sh/uv/install.sh | sh
downloading uv 0.9.13 aarch64-apple-darwin
no checksums to verify
installing to /Users/insilicogen/.local/bin
uv
uvx
everything's installed!
WARN: The following commands are shadowed by other commands in your PATH: uvx
~/projects/python > on master uv venv
Using CPython 3.12.9 interpreter at: /Users/insilicogen/miniconda3/bin/python3
Creating virtual environment at: .venv
Activate with: source .venv/bin/activate
~/projects/python > on master
```

개발 환경 구축

가상 환경 활성화: source */bin/activate

- uv venv 명령어로 가상환경 생성 시 Activate with: 이후 가상환경 활성화를 위한 명령어 출력
- 해당 명령어 복사 붙여 넣기 시 가상 환경 활성화

The screenshot shows a terminal window with the following session:

```
~/projects/python > on master curl -LsSF https://astral.sh/uv/install.sh | sh
downloading uv 0.9.13 aarch64-apple-darwin
no checksums to verify
installing to /Users/insilicogen/.local/bin
uv
uvx
everything's installed!
WARN: The following commands are shadowed by other commands in your PATH: uvx
~/projects/python > on master uv venv
Using CPython 3.12.9 interpreter at: /Users/insilicogen/miniconda3/bin/python3
Creating virtual environment at: .venv
Activate with: source .venv/bin/activate
~/projects/python > on master source .venv/bin/activate
~/projects/python > on master echo $VIRTUAL_ENV
/Users/insilicogen/projects/python/.venv
~/projects/python > on master
```

The line "Activate with: source .venv/bin/activate" is highlighted with a red rectangle.

개발 환경 구축

가상 환경 활성화: source */bin/activate

- 보통 터미널마다 가상환경이 활성화 되었다는 것을 표시하는 방식이 존재, 설정으로 바꿀 수 있음
- 혹은 echo \$VIRTUAL_ENV 명령어를 통해 가상 환경이 활성화 되어 있는지를 확인 가능

The screenshot shows a terminal window with the following session:

```
~/projects/python > on master curl -LsSf https://astral.sh/uv/install.sh | sh
downloading uv 0.9.13 aarch64-apple-darwin
no checksums to verify
installing to /Users/insilicogen/.local/bin
uv
uvx
everything's installed!
WARN: The following commands are shadowed by other commands in your PATH: uvx
~/projects/python > on master uv venv
Using CPython 3.12.9 interpreter at: /Users/insilicogen/miniconda3/bin/python3
Creating virtual environment at: .venv
Activate with: source .venv/bin/activate
~/projects/python > on master source .venv/bin/activate
~/projects/python > on master echo $VIRTUAL_ENV
/Users/insilicogen/projects/python/.venv
~/projects/python > on master 
```

The terminal interface includes tabs for '문제', '출력', and '터미널'. The '터미널' tab is active. The output pane shows the command history and its results. A red box highlights the command 'source .venv/bin/activate' and its immediate result. Another red box highlights the command 'echo \$VIRTUAL_ENV' and its result, which shows the path to the virtual environment. The status bar on the right indicates the current environment: 'base Py' and 'python Py'.

개발 환경 구축

Alphagenome github 클론 받기

- Alphagenome 오픈소스 패키지를 저장소에 클론 받습니다

1

Google

alphagenome github

X | ⌨ | ⌊ | ⌋ | 🔍

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See detailed insights & Compare multiple related Papers for :
“alphagenome github”

Compare insights ↗

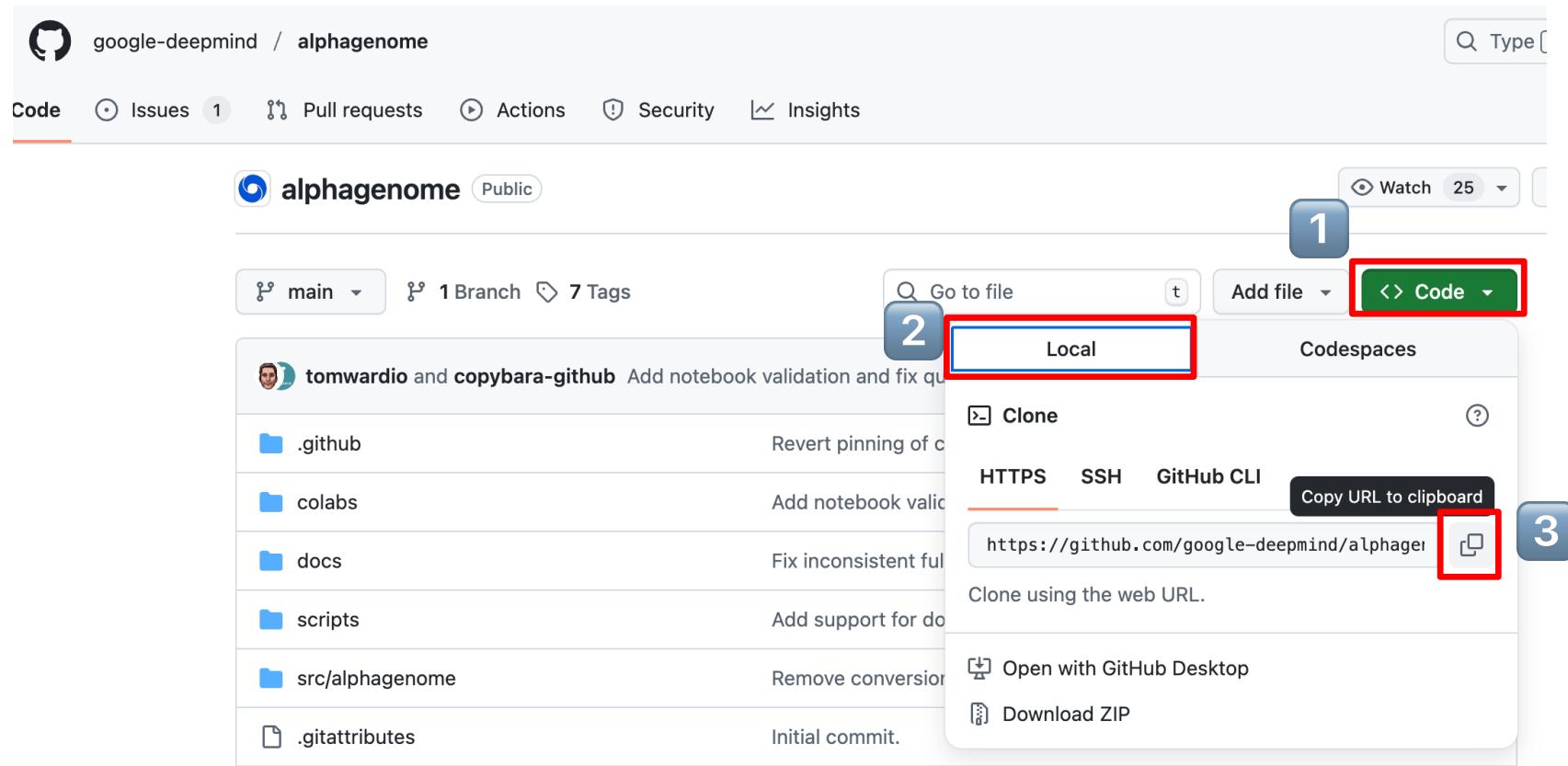
2 GitHub
https://github.com › google-deepmind › alphagenome ::
google-deepmind/alphagenome

The AlphaGenome API provides access to AlphaGenome, Google DeepMind's unifying model for deciphering the regulatory code within DNA sequences.

개발 환경 구축

Alphagenome github 클론 받기

- Alphagenome 오픈소스 패키지를 저장소에 클론 받습니다

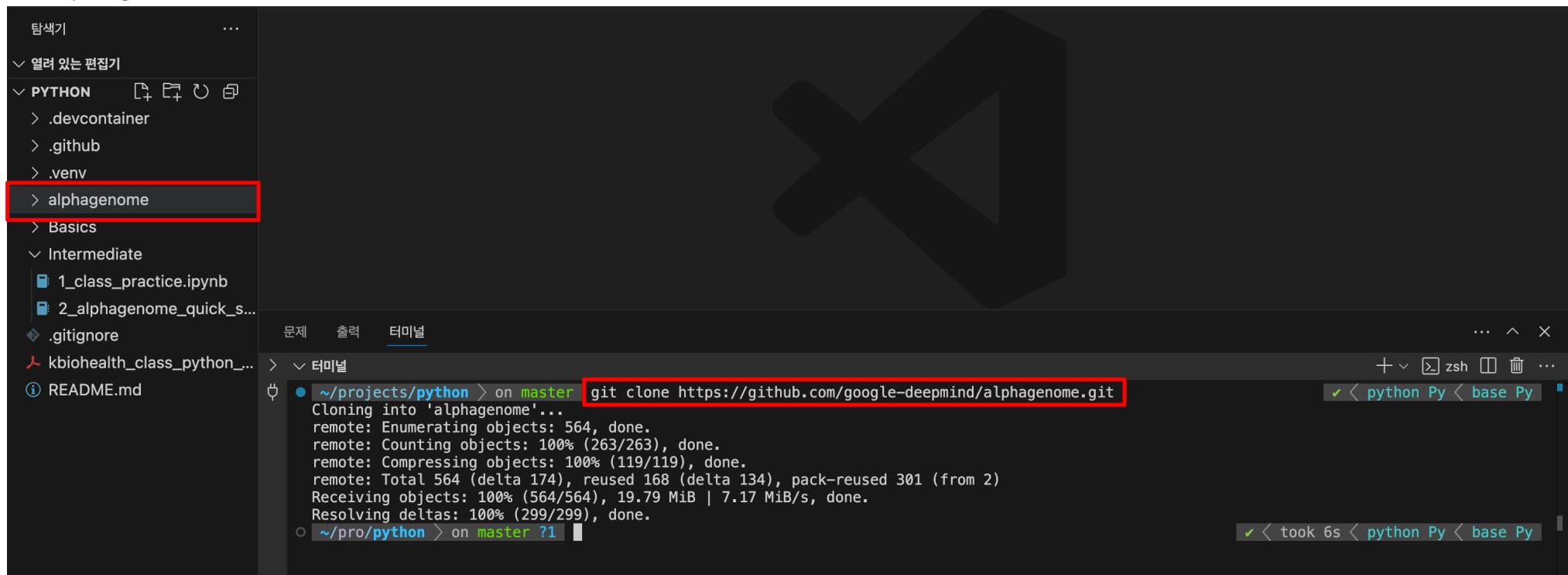


개발 환경 구축

Alphagenome github 클론 받기

- 복사된 URL에 대해 git clone
- alphagenome 폴더가 현재 작업 디렉토리에 정상적으로 생성되었는지 확인

주의사항: git clone 하기 전에 터미널에서 현재 작업디렉토리가 어디인지 파악하십시오



The screenshot shows the Visual Studio Code interface. On the left, the Explorer sidebar displays a file tree. The 'alphagenome' folder under the 'PYTHON' section is selected and highlighted with a red box. The main workspace shows a large dark logo in the center. At the bottom, the Terminal tab is active, showing the command `git clone https://github.com/google-deepmind/alphagenome.git` being run. This command and its output are also highlighted with a red box. The terminal output shows the progress of cloning the repository.

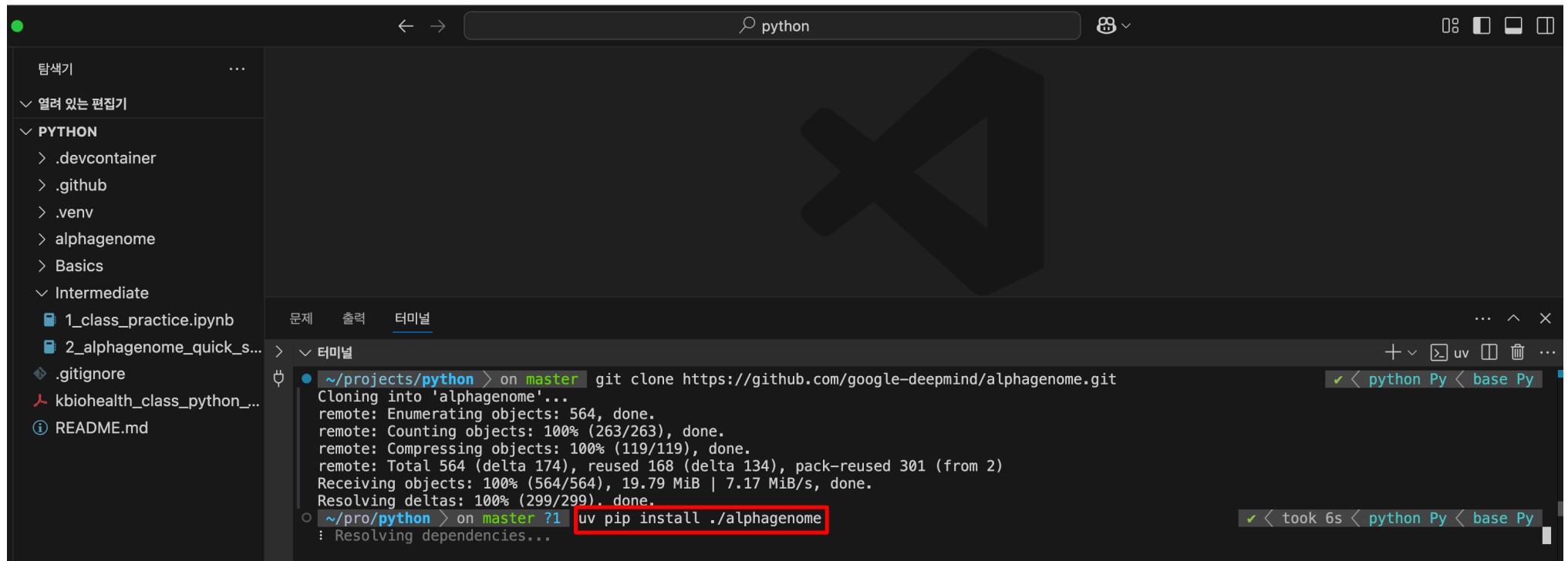
```
git clone https://github.com/google-deepmind/alphagenome.git
Cloning into 'alphagenome'...
remote: Enumerating objects: 564, done.
remote: Counting objects: 100% (263/263), done.
remote: Compressing objects: 100% (119/119), done.
remote: Total 564 (delta 174), reused 168 (delta 134), pack-reused 301 (from 2)
Receiving objects: 100% (564/564), 19.79 MiB | 7.17 MiB/s, done.
Resolving deltas: 100% (299/299), done.
```

개발 환경 구축

현재 디렉토리에 받은 alphagenome 설치하기

- uv pip install ./alphagenome (.은 현재 디렉토리)
- 일바

Git clone을 받아서 패키지 설치를 한 것은 소스 코드를 직접 작업공간에서 살펴보기 위함입니다. 일반적으로는 uv pip install <패키지 이름>으로 설치합니다.



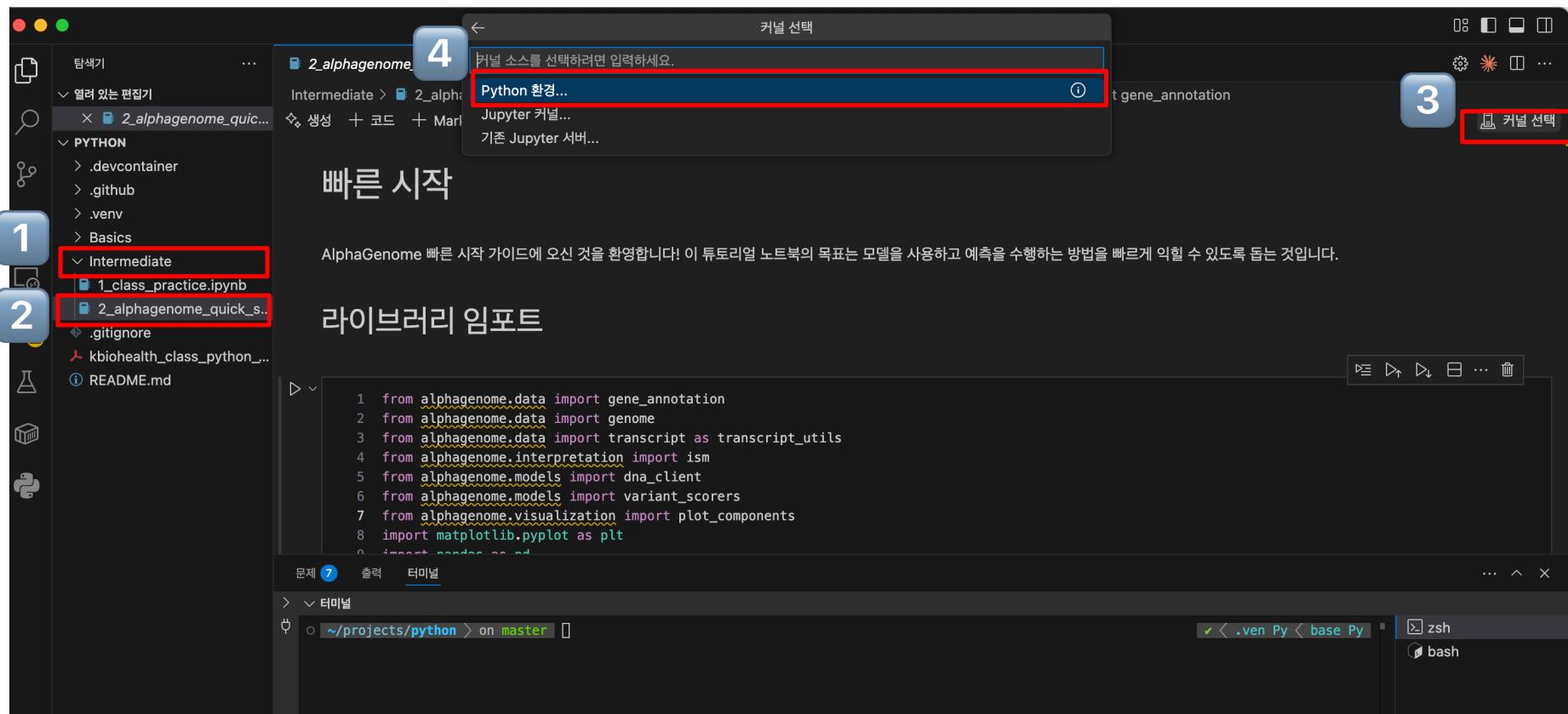
The screenshot shows the Visual Studio Code interface. On the left is the Explorer sidebar with a tree view of files and folders, including a 'PYTHON' folder containing '.devcontainer', '.github', '.venv', 'alphagenome', 'Basics', and 'Intermediate' subfolders, along with notebooks like '1_class_practice.ipynb' and '2_alphagenome_quick_s...'. The main area is a dark-themed terminal window. It displays two command-line sessions. The first session shows the output of a 'git clone' command for the 'alphagenome' repository from GitHub. The second session shows the command 'uv pip install ./alphagenome' being run, which is highlighted with a red rectangle. The status bar at the bottom right indicates the command took 6 seconds to execute.

```
Cloning into 'alphagenome'...
remote: Enumerating objects: 564, done.
remote: Counting objects: 100% (263/263), done.
remote: Compressing objects: 100% (119/119), done.
remote: Total 564 (delta 174), reused 168 (delta 134), pack-reused 301 (from 2)
Receiving objects: 100% (564/564), 19.79 MiB | 7.17 MiB/s, done.
Resolving deltas: 100% (299/299), done.

uv pip install ./alphagenome
: Resolving dependencies...
```

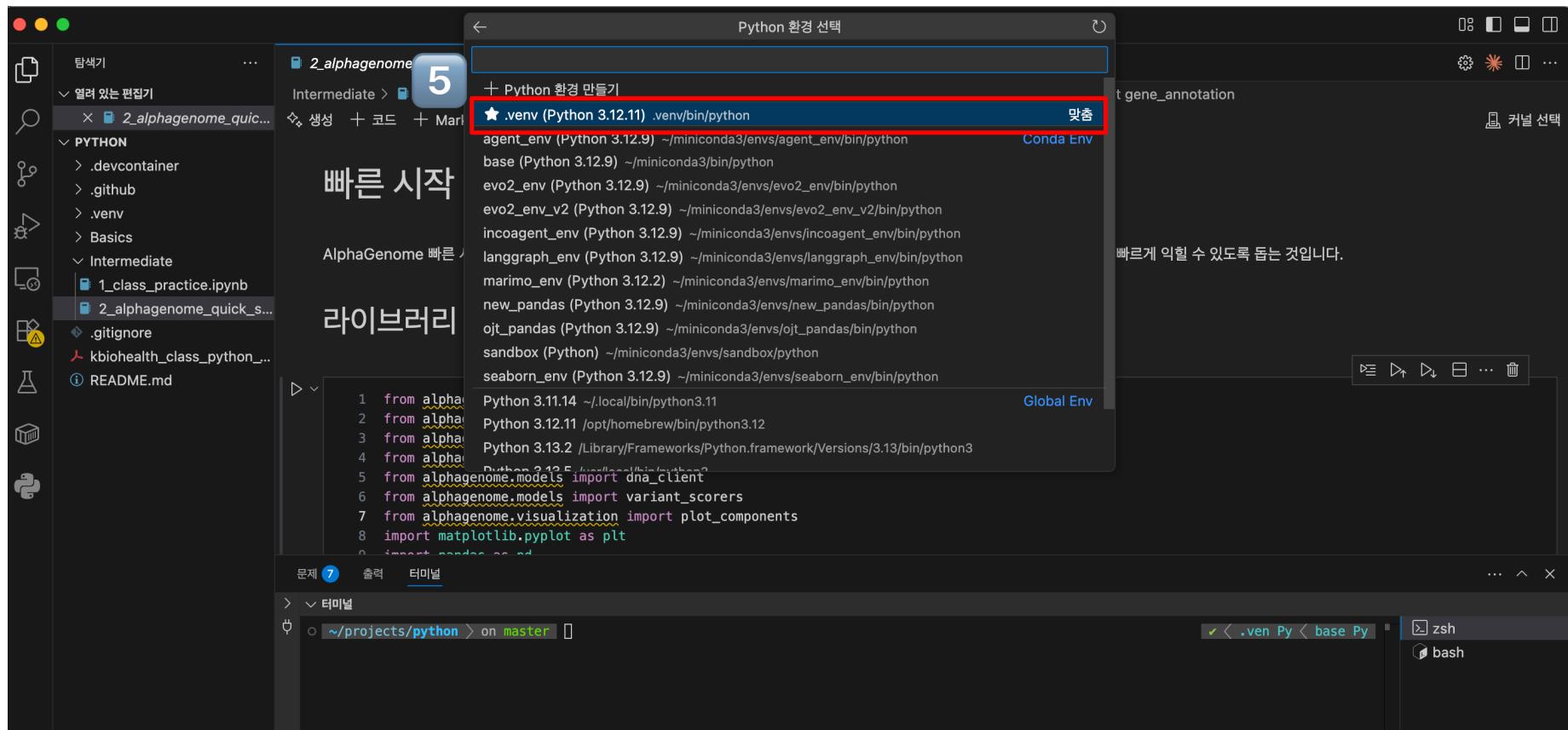
개발 환경 구축

Jupyter notebook 열고 커널 선택하기



개발 환경 구축

Jupyter notebook 열고 커널 선택하기



개발 환경 구축

첫번째 cell 실행 (shift + enter)

The screenshot shows a Jupyter Notebook interface with the following details:

- Title Bar:** python
- File Tree:** Shows a directory structure under PYTHON, including .devcontainer, .github, .venv, Basics, Intermediate, and two notebooks: 1_class_practice.ipynb and 2_alphagenome_quick_start.ipynb.
- Cell Content:** The notebook cell contains Python code for importing various modules from the alphagenome library, including gene_annotation, genome, transcript_utils, ism, dna_client, variant_scorers, plot_components, plt, and pd. The output of the cell shows the time taken: 30.6s.
- Output Panel:** Shows a warning message from tqdm: "TqdmWarning: IPProgress not found. Please update jupyter and ipywidgets." It also shows the path: /Users/insilicogen/projects/python/.venv/lib/python3.12/site-packages/tqdm/auto.py:21: TqdmWarning: IPProgress not found. Please update jupyter and ipywidgets. from .autonotebook import tqdm as notebook_tqdm".
- Terminal:** Shows a terminal window with the command: ~projects/python > on master. It has tabs for .ven Py, base Py, zsh, and bash.

개발 환경 구축

AlphaGenome API key 발급

1

Google alphagenome api

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GitHub https://github.com › google-deepmind › alphagenome :

[google-deepmind/alphagenome](#)

The AlphaGenome API provides access to AlphaGenome, Google DeepMind's unifying model for deciphering the regulatory code within DNA sequences.

2

Google DeepMind https://deepmind.google.com › science › alphagenome :

[AlphaGenome](#)

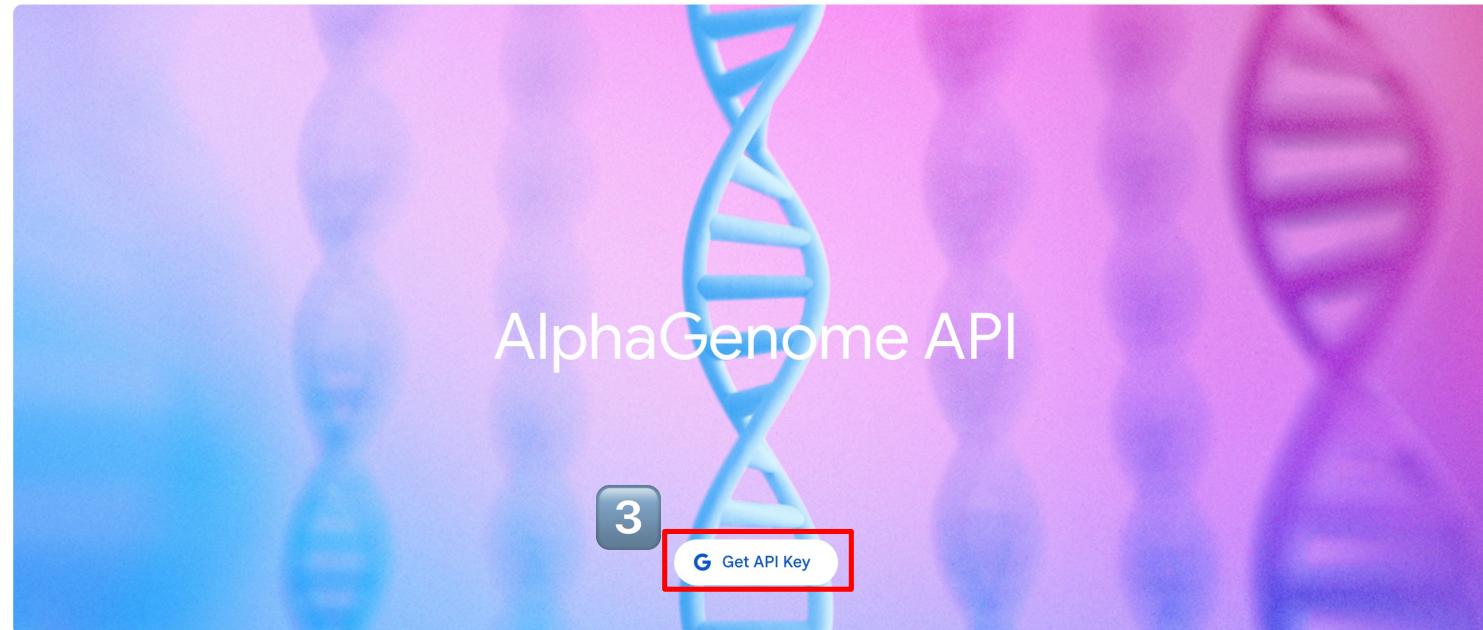
AlphaGenome – Access Google DeepMind's unifying genomics model for deciphering DNA function.

A screenshot of a Google search results page. Step 1 highlights the search bar with the query "alphagenome api". Step 2 highlights the "AlphaGenome" link in the search results, which points to the official Google DeepMind documentation for the AlphaGenome API.

개발 환경 구축

AlphaGenome API key 발급

AlphaGenome PREVIEW API Community Sign in



개발 환경 구축

AlphaGenome API key 발급

Complete profile

Google account
 goosebumps0704@gmail.com

What is your role?*
ML researcher

How did you hear about us?*
Other

How often do you use APIs?*
Sometimes

- Subscribe to announcements about new AlphaGenome products and features.
- Subscribe to tips and surveys about AlphaGenome.

4

[Continue to Terms of Service](#)

AlphaGenome API key 발급

If applicable, please confirm your:

Organization, university, or other affiliation(s)

As a reminder, AlphaGenome API is not available for: (i) commercial work, even if on behalf of a non-commercial organization; or (ii) commercial organizations. The only exception is journalism which is permitted.

5 I accept the [Google APIs Terms of Service](#) and [AlphaGenome API Additional Terms of Service](#).

6 [Accept and continue](#)

개발 환경 구축

AlphaGenome API key 발급

Account settings

API Key

To use the AlphaGenome API you need to create an API key below.

7

Create API Key

API Key generated

Use your API Key securely.

8

Your API Key —

Copy

개발 환경 구축

복사한 alphagenome API key 붙여넣기

The screenshot shows a Jupyter Notebook interface with a dark theme. On the left is a sidebar with icons for file operations, a search bar, and a tree view of files and folders. The main area has a toolbar at the top with various buttons. A code cell is active, showing Python code:

```
9 import pandas as pd
[1]   ✓ 30.6s
...
/.../2_alphagenome_quick_start.ipynb:21: TqdmWarning: IPProgress not found. Please update jupyter and ipywidgets.
from .autonotebook import tqdm as notebook_tqdm
```

The code cell contains two lines of code:

```
1 API_KEY = "<your_api_key_here>"  
2 dna_model = dna_client.create(API_KEY)
```

The line `API_KEY = "<your_api_key_here>"` is highlighted with a red rectangle. Below the code cell, there is explanatory text and another code cell:

DNA 시퀀스에 대한 출력 예측

AlphaGenome은 DNA 시퀀스로부터 예측을 수행하는 모델입니다. 모델을 로드해보겠습니다:

```
1 [output.name for output in dna_client.OutputType]
```

터미널 탭에서 실행된 명령은:

```
> ~/projects/python > on master
```

터미널 아래에는 bash와 zsh 탭이 있습니다.