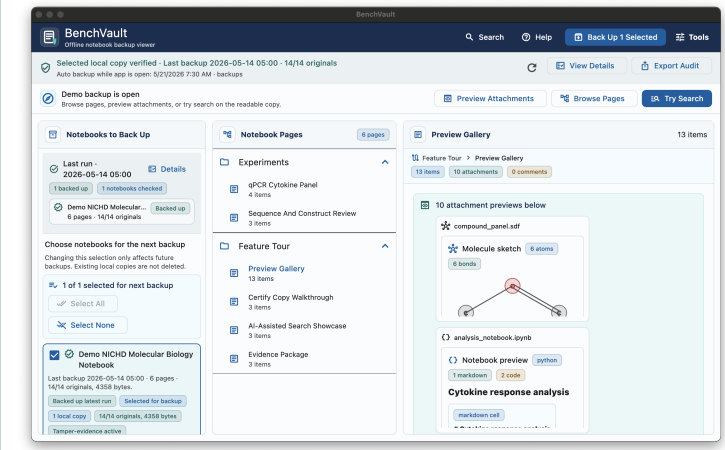
BENCHVAULT QUICKSTART

Back up LabArchives notebooks for offline review.

Back up LabArchives notebooks and read them offline

Full-size archives	Read-only viewer	Integrity warnings

Owner-only backup rule
At NIH, full-size LabArchives notebook backup is owner-only. If a notebook is skipped because your account is not the owner, ask the notebook owner to run the backup from their own account.



May 18, 2026 · macOS first · Windows and iPad work in progress

Keep credentials, notebook IDs, source PDFs, and backups private and local.

BenchVault is a desktop app for backing up LabArchives electronic lab notebooks and reading those backups later in a read-only viewer. It is designed for lab records, experiment notes, protocols, tables, images, PDFs, sequence files, instrument output, and other bench-research attachments. It is especially useful when the LabArchives website is unavailable, the Internet is unavailable, or you need to review a notebook while traveling or working somewhere without reliable Wi-Fi.

At NIH, BenchVault is built for the FedRAMP-authorized LabArchives service used by the agency. The app uses the shorter name `LabArchives` throughout.

What BenchVault Does

- Backs up every notebook that your LabArchives account is allowed to back up.
- Connects to LabArchives only for sign-in, notebook listing, and backup download.
- Checks credentials, storage, and safety settings before backup starts.
- Keeps the original LabArchives archive file for preservation.
- Lets you read backed-up notebooks when the website or network is unavailable.
- Verifies full-size original attachment files after backup by byte size.
- Records digital fingerprints for each backup and warns if files change later.
- Creates an easy-to-read copy and search data for each backup.
- Lets you search backed-up notebooks locally, with optional AI-assisted answers when you add an AI API key.
- Includes a synthetic demo backup so you can try the viewer before connecting LabArchives.
- Lets you schedule routine backups while the app is open.
- Stores credentials and backups locally.

> **Local handling note**
> BenchVault is for backup and offline viewing. The production app does not add, update, delete, upload, or write content back to the original LabArchives notebook.

Try the Demo Backup

On the setup screen, click `Open Demo Backup` to try BenchVault without entering LabArchives credentials. The demo is synthetic, but it uses the same viewer, integrity-check, Certify Copy, and search surfaces used for real backups.

The demo notebook is built to show the parts that matter most during review:

- A preview gallery with CSV, FASTA, Sanger trace, SnapGene-style DNA, SDF chemistry, PDF, Excel, Jupyter, TIFF, PNG, ZIP, and media attachments.
- A verified local-copy fingerprint so `Certify Copy` can prepare a witness email draft.
- An AI-assisted search example with links back to source pages, with local fallback search still available when no AI key is configured.

Before You Start

You need:

- Your LabArchives email address.
- Your LabArchives API access ID.
- Your LabArchives API access key.
- A local folder where routine backup copies should be saved.
- An AI API key if you want AI-assisted notebook search.

The API access ID and access key are not your LabArchives password. They are the LabArchives API credentials assigned for backup access. If you do not know where to find them, ask your BenchVault, LabArchives, or IT support contact before starting setup.

At NIH, full-size LabArchives notebook backup is available only to the notebook owner. If your account can view a notebook but does not own it, BenchVault may list the notebook but LabArchives will not allow BenchVault to download its full backup.

Local handling note
If a notebook is skipped because of ownership, ask the notebook owner to run the backup from their own LabArchives account.

Choose a backup folder that is easy to protect and easy to find. A good pattern is to create a dedicated folder named `BenchVault_Backups` in a secure local or approved institutional storage location.

If macOS Blocks the App

Current beta builds are not yet signed and notarized with an Apple Developer certificate. macOS may show a warning that it cannot verify `BenchVault.app` or may offer to move it to the Trash. This is expected for an unsigned beta copy, but you should only bypass the warning for a release you intentionally downloaded from the BenchVault GitHub release page.

Recommended steps:

1. Download BenchVault only from the project GitHub release page.
2. If the release includes `SHA256SUMS-macOS.txt`, compare the checksum of the downloaded zip before opening the app.
3. Unzip the macOS package and move `BenchVault.app` to `Applications` or another folder you control.
4. If macOS blocks launch, open `System Settings` > `Privacy & Security`, find the BenchVault warning, and click `Open Anyway`.
5. If `Open Anyway` is not visible, Control-click `BenchVault.app`, choose `Open`, then confirm that you want to open it.

If you did not download the app yourself, or the checksum does not match the release file, do not bypass the warning.

First Launch Setup

1. Open BenchVault.
2. In `Authorize`, enter your LabArchives email address, access ID, and access key.
3. In `Store`, choose the folder where routine backup copies should be stored.
4. In `Search`, leave local search enabled, or add an AI API key if you want AI-assisted notebook search.
5. Click `Connect and Check Notebook Access`.
6. Complete the LabArchives sign-in or authorization step in the browser window that opens.
7. Return to BenchVault when the browser step finishes.

If the browser step does not return to BenchVault cleanly, the browser may show a LabArchives authorization code. In BenchVault, go to `Review`, click `Use Auth Code Instead`, paste that code, then click `Connect with Auth Code`.

Run a Manual Backup

1. Review the backup status bar at the top of the window.
2. Open `View Details` if it says backup is blocked or a copy needs review.
3. Resolve blocking checks before backup.
4. Select the notebooks you want to back up.
5. Click `Back Up Selected`.
6. Keep the app open while the backup is running.
7. Watch the status messages in `Recent Activity`.
8. When backup finishes, select a copy under `Saved Backup Copies`.
9. Browse pages in `Notebook Pages`.
10. Select a page to read its backed-up contents.

Before downloading notebooks, BenchVault checks that it has the information and local storage it needs. If something important is missing, the app stops and shows what to fix before you try again.

After each run, open `Details` to see what happened to each notebook. A notebook can be backed up, skipped, or marked for review. A skipped notebook may still have an older backup copy available in the viewer.

Some skipped notebooks can be retried, such as notebooks skipped because of a network, storage, extraction, verification, or sign-in problem. Notebooks skipped because of ownership should be backed up by the notebook owner.

How To Read Backup Results

- `Backed up`: BenchVault saved the notebook backup and checked the expected original attachment files.
- `Needs owner action`: your account can see the notebook, but LabArchives did not allow your account to download the full backup. Ask the notebook owner to run BenchVault.

- `Retry`: the notebook was skipped for a problem that may be fixable, such as sign-in, network, storage, or extraction.
- `Local copy not verified`: BenchVault found a later change in the local backup files. Review the details before relying on that copy.

Confirm Full-Size Originals

For each successful notebook backup, BenchVault checks the original attachment files that LabArchives included in the backup. A successful backup means:

- The LabArchives backup file was saved.
- Each reported original attachment file was found in the backup.
- Each original attachment file has the size LabArchives reported.
- BenchVault saved a backup check record so the viewer can warn about later file changes.

You normally do not need to open the technical check files. For support review, the main attachment check file is `original_files_manifest.json`.

BenchVault also saves `integrity_manifest.json` for the whole backup run. When you open a backup later, the viewer checks the protected files again. If a file was changed, removed, or added, BenchVault blocks normal viewing and shows `Local copy not verified` until you review the details and deliberately choose `Open for Triage Only` to review the unverified copy.

This helps catch accidental or suspicious changes to local backup files. It does not make the backup impossible to change, and it is not a legal certification by itself.

BenchVault also checks that attachment paths stay inside the selected backup folder before previewing or copying files.

> **Local handling note**
> Protect the backup folder after it is written. BenchVault can warn when local backup files change, but it does not replace records policy, chain-of-custody review, or institutional guidance.

Export An Audit Summary

When a backup is selected, the backup status bar includes `Export Audit`. Use it when you need a local review packet for records staff, IT/security review, or your lab's archive process.

BenchVault writes four local report files under the selected backup run's `audit/` folder:

- `backup_audit_summary.md`: readable backup and file-check summary.
- `backup_audit_summary.json`: structured backup details for support or review.
- `integrity_files.csv`: protected file paths, sizes, digital fingerprints, and backup-time file dates.
- `external_hash_anchor.txt`: a short fingerprint record that can be stored in a separate records system or other write-once location.

Like the viewer warning, the audit export helps show whether local backup files changed after backup. It is not a legal certification by itself.

Certify A Backup Copy By Email

After a backup copy is verified, you can choose `Certify Copy`. BenchVault opens a prepared email draft with the backup copy's fingerprint.

Send the email to someone outside your own mailbox, such as a colleague, supervisor, SD, records staff, or a shared institutional mailbox. The email can serve as a witness record that this backup-copy fingerprint existed when the recipient's mail system received it.

The email does not include notebook contents, attachments, credentials, or local absolute paths. It includes only the notebook name, backup ID, backup time, file counts, and digital fingerprints.

This certifies the local backup copy. It does not certify the live LabArchives notebook, and it does not say anything about later edits made online after the backup was created.

Supported Attachments

LabArchives can attach documents of any file type and format. BenchVault therefore preserves every original file it finds in a full-size backup and can save it locally even when no inline preview is available.

The read-only viewer recognizes the major LabArchives attachment families:

- Common browser images such as PNG, JPG, JPEG, GIF, WebP, and BMP.
- Text, tabular, structured, and sequence files such as TXT, CSV, TSV, Markdown, JSON, XML, FASTA, GenBank, EMBL, BED, VCF, GFF, and GTF.
- PDFs and Microsoft Office documents.
- Jupyter notebooks.
- SnapGene, Geneious, Sanger trace, and related molecular biology files.
- Chemical structure files such as CDX, CDXML, MOL, SDF, and SKC.
- Media files, archives, and other custom instrument exports.

BenchVault should preview every format LabArchives can preview, and it also adds safe local previews for additional research formats. Current previews include common images, CSV/TSV-style tables, FASTA/FASTQ/GenBank sequence viewers, MOL/SDF molecule sketches, Jupyter notebook cell cards, XLSX worksheet tables, PDF/Office/TIFF/media thumbnails on macOS when Quick Look can render them, Sanger trace chromatograms, format-specific PDF/Office/TIFF/media fallback cards, molecular biology file metadata, media details, and archive/package file lists.

Some proprietary formats still need their original application for full visual inspection. HTML and SVG attachments use a rendered platform preview when available. The viewer does not run embedded scripts, macros, notebooks, remote resources, or instrument workflows.

Attachment cards show whether the original file was preserved in the backup, whether the format is usually viewable in LabArchives, the reported byte size, and the relative path of the preserved original file. Use the `Copy Original` button

on the card to copy the original file into a folder you choose.

Search Backed-Up Notebooks

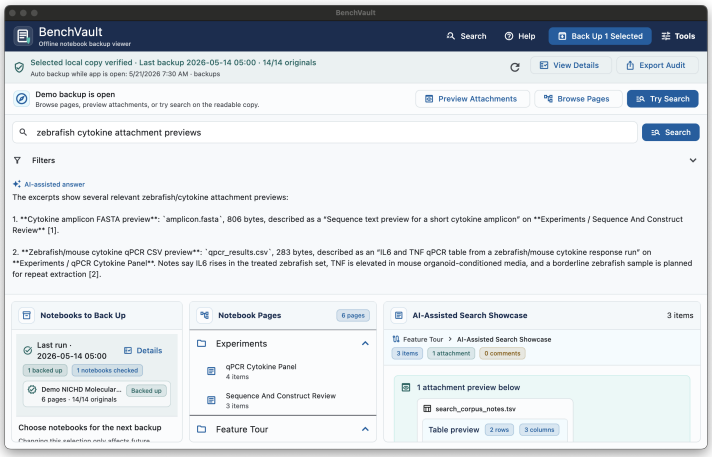


Figure. Notebook search with AI-assisted option.

Use the search field above the notebook viewer to search backed-up content. BenchVault always creates a local readable copy first, then searches that copy. Use the search controls to narrow results to page text, attachments, comments, exact phrases, or verified backups only.

Search works without AI-assisted search. In that mode, BenchVault searches the readable backup text on your computer using word matching, phrase matching, and typo-tolerant matching.

If you add an AI API key, BenchVault can use selected matching excerpts to return an answer with links back to the local backup pages. Enable this only for content that your local policy allows to be used with AI-assisted search. App launches store the AI key in platform secret storage when available: macOS Keychain, Windows Credential Manager, or iPadOS Keychain.

> **Local handling note**
> Do not share credentials, AI keys, notebook IDs, source PDFs, or raw backup archives in email, chat, public repositories, or tickets unless your local policy explicitly allows it.

BenchVault uses platform secret storage for newly saved LabArchives access credentials and AI API keys when available. Setup details, notebook lists, schedules, and backup check records remain local files.

Useful searches include:

- `Which pages mention zebrafish hypoxia imaging?`
- `Find attachment records for qPCR or RNA-seq runs.`
- `What did the PI reviewer ask us to repeat?`
- `Show pages about freezer transfer or chain of custody.`

Set Auto Backup While App Is Open

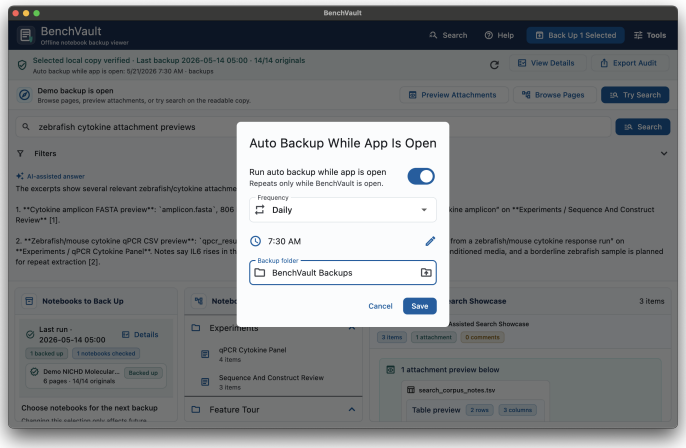


Figure. Auto backup schedule.

1. Click the schedule button in the toolbar.
2. Turn `Run auto backup while app is open` on.
3. Choose `Daily` or `Weekly`.
4. Pick the time of day.
5. Confirm the backup folder.
6. Click `Save`.

Scheduled backups run while BenchVault is open. If the app is closed, a scheduled backup will not run until app-level background scheduling is added for your platform.

Known Limitations

BenchVault is meant for backup and offline viewing. It does not edit LabArchives, write records back into LabArchives, back up external systems linked from notebook pages, or replace institutional records policy.

Current practical limits:

- Full-size backup is limited by LabArchives owner permissions.
- Auto backups run only while the app is open.
- Integrity checks can warn about changed local backup files, but they do not make files impossible to change and are not legal certification.
- The viewer uses visual or domain-specific previews where possible. Some proprietary files still need their original application for full inspection.
- Search does not read inside most Office, PDF, image, media, archive, or proprietary instrument files. AI-assisted search uses only selected excerpts when an AI key is configured; otherwise BenchVault uses local search.

- Credentials and backups are local files protected by local machine controls; they are not stored in a built-in encrypted vault.
- macOS is the primary tested platform. Windows work still needs real workstation validation. iPad can be used for read-only review of backups prepared by the desktop app, but full backup creation is blocked in this beta.

The full limitations list is maintained in `docs/implementation_limitations.md`.

For Support: Backup Folder Structure

BenchVault organizes routine copies inside the folder you choose:

```
notebooks/
  notebook_name/
    year/
      month/
        day/
          run_timestamp/
            notebook.7z
            extracted/
            render_notebook.json
            readable/
              notebook.md
              search_chunks.jsonl
            original_files_manifest.json
            integrity_manifest.json
            backup_record.json
runs/
  year/
    month/
      day/
        run_timestamp.json
```

This structure keeps each notebook separated and keeps every backup run date-stamped. Most users can skip this section; you normally do not need to edit these files directly.

Read-Only Viewer

The viewer is for checking and reading backed-up records. It does not edit LabArchives and it does not write changes back to LabArchives.

Use the viewer to:

- Confirm a notebook was backed up.
- Check each notebook's `Notebook Protection` card for latest run status, owner action, prior local copies, and original-attachment verification.
- Use the page breadcrumb and outline to orient yourself inside long notebooks.
- Review page titles and entries.
- Read text entries, rich text, and headings.
- Check attachment names, types, sizes, and preservation status indicators.
- Click the `Copy Original` button on an attachment card to copy the backed-up original file into a folder you choose.
- Open the backup folder when you need to inspect the preservation archive.

- Watch the backup status bar before relying on a backup copy.
- Open the integrity details button to review whether any protected backup file changed, went missing, or unexpectedly appeared.
- Click `Export Audit` in the status bar to export a local Markdown summary, structured JSON, integrity-file CSV, and external hash record for the selected backup.

Good Lab Practice

- Run a manual backup after important notebook updates.
- Keep routine backup scheduling enabled on the computer used for records work.
- Periodically check that recent backups appear in the viewer.
- Keep the backup folder in a protected location.
- Do not email, upload, or commit credential files, notebook access files, notebook IDs, or raw backup archives.
- Treat the `.7z` archive and `original_files_manifest.json` as preservation records.

Troubleshooting

`Setup needed`: Connect LabArchives credentials again from the setup screen.

`Skipped notebook`: Your account can see the notebook, but LabArchives did not allow your account to download the full backup. At NIH, the notebook owner should run the backup.

`Original attachment verification failed`: BenchVault did not find every full-size original attachment or the file sizes did not match. Run backup again. If it still fails, save the run details or screenshot the error, then contact your BenchVault, LabArchives, or IT support contact.

`No saved notebook backups yet`: Click `Back Up Selected`, or check that the backup folder is available.

Quick Checklist

- Connect credentials.
- Choose backup folder.
- Select notebooks and click `Back Up Selected`.
- Confirm the backup appears in the viewer.
- Check that original attachment verification passed.
- Enable routine backups.