

Contrast enhanced longitudinal changes observed in an experimental bleomycin-induced lung fibrosis rat model by radial DCE-MRI at 9.4T

SND-ID: 2024-177. **Version:** 1. **DOI:** <https://doi.org/10.5878/b4cg-vc79>

Detta är en tidigare förhandsvisning av en nu publicerad katalogpost.

Du når den publicerade posten här: <https://snd.se/sv/catalogue/dataset/2024-177>.

Citering

In 't Zandt, R., & . (2025) Contrast enhanced longitudinal changes observed in an experimental bleomycin-induced lung fibrosis rat model by radial DCE-MRI at 9.4T (Version 1) [Dataset]. Lunds universitet. Tillgänglig via: <https://doi.org/10.5878/b4cg-vc79>

Alternativ titel

Contrast enhanced MRI in a experimental bleomycin-induced fibrosis model

Skapare/primärforskare

[René In 't Zandt](#) - Lunds universitet

Lunds universitet, Lund Bildcenter LBIC

Forskningshuvudman

[Lunds universitet](#) - Lunds universitet, Lund Bildcenter, LBIC

Beskrivning

The archive contains for the most part the dynamic contrast enhanced UTE MRI data in an experimental bleomycin lung injury model in rats. The data has been reconstructed using a time resolution of 10 seconds. A total of 247 time points are available and cover the 28 minute time period. Gadolinium based contrast agent is injected after 7 minutes. The segmented lung volumes are also part of the archive, for easy lung tissue selection in the data analysis. All images are in Dicom format. The histology data to estimate tissue-air fraction is included as well. Txt files are tables that form the basis for all figures published in the manuscript above.

The Bruker raw MRI data, and the scripts to reconstruct the data are not included in this repository due to the file size and due to the fact that the scripts use different software packages (BART toolbox, Bruker library, MiceToolKit nodes). Please contact the author (rene.in_t_zandt@med.lu.se) if the reconstruction of the images out of the RAW MRI data is to be set up. The necessary scripts will be provided together with some assistance with how to set up the software environment.

Data innefattar personuppgifter

Nej

Språk

[Engelska](#)

Population

Elva hanråttor av Sprague-Dawley-stammen fick en enda intratrakeal dos av bleomycin (1000 iU), och fyra kontrollråttor fick saltlösning.

Tidsdimension

[Tidsserie](#)

[Longitudinell](#)

Studiedesign

Preklinisk studie

Beskrivning av studiedesign

Eleven male Sprague-Dawley rats received a single intratracheal dose of bleomycin (1000iU) and four control rats received saline. Imaging was performed on days 7 and 28 post-induction. Ultra-short echo time imaging was used to image the lung for 7 minutes after which Clariscan was injected intravenously. Lung signal changes were measured for an additional 21 minutes. Images were reconstructed with a sliding-window approach, providing a temporal resolution of 10 seconds per image. After imaging on day 28, animals were euthanized, and lungs were collected for histology.

Urvalsmetod

A total of 15 animals were included in this study. 4 animals were used as controls (receiving only Saline instillation) and 11 animals received bleomycin. Based on prior experiences with the bleomycin model, 5 out of 11 animals were designated as backup subjects from the imaging group of bleomycin exposed animals, to maintain the study's reliability and continuity in case of unexpected issues with the primary subjects, such as extensive weight loss or imaging or anesthesia related events. Day 7 and day 28 were chosen for DCE-MRI scan days as two representative days of dominant inflammatory and fibrotic time points respectively. The planned group size for DCE-MRI in bleomycin exposed animals was $n=6$.

DCE-MRI was successful in 3 out of 4 control animals on day 7, for 1 animal the Venflon catheter punctured the venous artery and substantial amount of fluid was injected extra-vascular in the tail. This animal was removed from the DCE-MRI on day 28 due to vascular damage in the tail. Subsequently, only 3 controls were available for DCE-MRI on day 28 as well. In the bleomycin-exposed group, all DCE-MRI injections ($n=6$) were completed successfully on day 7. On day 28, one contrast agent injection partly failed as the images showed that only a fraction of the contrast agent reached the lung. This reduced the group size for DCE-MRI in bleomycin-exposed group animals to $n=5$.

The tissue to air fraction was estimated based on microscopy sections in 4 control animals of which 3 were scanned using DCE-MRI and for 11 bleomycin-exposed animals of which 5 were scanned on day 28 using DCE-MRI (Fig 4A). During inspection of the samples, it was noted that the inflation procedure during fixation of the lung tissue clearly failed for one of the control animals (nr 03) and for one of the bleomycin-exposed animals (nr 07). This reduced the size of the bleomycin group to 10 individuals and the control group to 3 animals for the tissue fraction quantification. The data for animals 03 and 07 is included in the repository to demonstrate the effect of incomplete inflation of the lungs.

Dataformat / datastruktur

[Stillbild](#)

Ansvarig institution/enhet

Lunds universitet, Lund Bildcenter, LBIC

Medverkande

Irma Mahmutovic Persson - Lunds universitet, Lunds Bildcenter LBIC

Finansiering

- Finansiär: European Union's Horizon 2020
- Diarienummer hos finansiär: grant agreement No 116106
- Projektnamn på ansökan: IB4SD-TRISTAN
- Information om finansiering: The research leading to these results received funding from the Innovative Medicines Initiatives 2 Joint Undertaking under grant agreement No 116106 (IB4SD-TRISTAN). This Joint Undertaking receives support from the European Union's Horizon 2020 research and innovation programme and EFPIA. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript

Etikprövning

Lund - dnr 4003/2017

Forskningsområde

[Andra medicinska och farmaceutiska grundvetenskaper](#) (Standard för svensk indelning av forskningsämnen 2011)

[Allmän hälsa och välbefinnande](#) (CESSDA Topic Classification)

Nyckelord

[Lungsjukdomar](#), [Bleomycin](#), [Magnetisk resonanstomografi](#), [Lungskada](#)

Publikationer

in 't Zandt R, Mahmutovic Persson I, Tibiletti M, von Wachenfeldt K, Parker GJM, Olsson LE, et al. (2024) Contrast enhanced longitudinal changes observed in an experimental bleomycin-induced lung fibrosis rat model by radial DCE-MRI at 9.4T. PLoS ONE 19(9): e0310643

DOI: <https://doi.org/10.1371/journal.pone.0310643>

Tillgänglighetsnivå

Åtkomst till data via SND

Data är fritt tillgängliga

Användning av data

[Att tänka på vid användning av data som delas via SND](#)

Licens

[CC BY 4.0](#)

Versioner

Version 1. 2024-09-25

Kontakt för frågor om data

Rene in t Zandt

rene.in_t_zandt@med.lu.se

Ladda ner metadata

[DataCite](#)

[DDI 2.5](#)

[DDI 3.3](#)

[DCAT-AP-SE 2.0](#)

[JSON-LD](#)

[PDF](#)

[Citation \(CSL\)](#)

Publicerad: 2024-09-25

Senast uppdaterad: 2024-09-27