



# QIN GBM Treatment Response

## Summary

This collection contains “double baseline” multi-parametric MRI images collected on patients with newly diagnosed glioblastoma. The patients were scanned after surgery but prior to the start of therapy, typically 2-5 days apart. The structural images included T1-weighted pre- and post-contrast images, T2-weighted images, FLAIR and MEMPRAGE images. Advanced MRI sequences included Diffusion Weighted (DW) Imaging, Dynamic Contrast-Enhanced MRI (DCE-MRI), and Dynamic Susceptibility Contrast MRI (DSC-MRI). The value of this collection is to provide clinical image data to establish the test-retest characteristics of parameters calculated from DW-MRI, DCE-MRI, and DSC-MRI such as ADC, Ktrans and rCBV. Data were provided by Dr. Elizabeth Gerstner and Dr. Kalpathy-Cramer (MGH) as part of their participation in the Quantitative Imaging Network. The images were obtained on 32-channel Siemens Trio 3T scanners using Siemens 32-channel head coils. T1-weighted imaging was performed using a 2D FLASH sequence with TR/TE/ = 600 ms/12 ms/90°, matrix size 256 × 216, field of view (FOV ) 185mm × 220mm, 23 slices and 5mm slice thickness. T2-weighted imaging was performed using a 3D SPACE spin-echo sequence with TR/TE = 3200 ms/428 ms, matrix size 256 × 258, FOV 256mm × 256mm, 176 slices and 1mm slice thickness. FLAIR was performed using a 2D spin-echo inversion-recovery sequence with TR/TI/TE = 10000 ms/2500 ms/70 ms, matrix size 256 × 162, FOV 185mm × 220mm, 23 slices and 5mm slice thickness. MEMPRAGE was performed using a 3D multi-echo Magnetization Prepared Rapid Gradient Echo sequence with TR/TI/TE1/TE2/TE3/TE4/ =2530 ms/1200 ms/1.64 ms/3.5 ms/5.36 ms/7.22 ms/7°, matrix size 256 × 256, FOV 256mm × 256mm, 176 slices and 1mm slice thickness. A DW echo planar imaging sequence with trace diffusion sensitization and b-values of 0 and 700 s/mm<sup>2</sup>, TR/TE = 7980 ms/84 ms, matrix size 128 × 128, FOV 237mm × 237mm, 64 slices and 1.86mm slice thickness, provided data for Apparent Diffusion Coefficient (ADC) maps. To estimate pre-contrast T1 relaxation time for DCE quantitation purposes, T1 mapping was performed by using a 3D FLASH sequence before the injection of contrast agent with TR/TE = 7.3 ms/4.41 ms, matrix size 128 × 128, FOV 230mm × 230mm, 20 slices, and 2.1mm slice thickness. This sequence was repeated five times at five different flip-angles of 2°, 5°, 10°, 15°, and 30°. DCE MRI utilized a 3D FLASH dual gradient-echo sequence with with TR/TE1/TE2/ = 6.8 ms/2.61 ms/3.89 ms/10°, matrix size 128 × 128, FOV 230mm × 230mm, 20 slices and 2.1mm slice thickness. The acquisition was repeated for 60 times (frames) for a total scan time of 6 min, corresponding to a temporal resolution of 6 s. A bolus of 0.1 mmol/kg of Gd-DTPA (gadopentetic acid) was injected 52 s after the scan started. Finally, a combined gradient-echo (ge) and spin-echo (se) 2D EPI sequence was performed to acquire DSC-MRI data with TR/TE(ge)/TE(se)/ = 1500 ms/31 ms/95 ms/80°, matrix size 160 × 160, FOV 192mm × 192mm, 12 slices and 5mm slice thickness. The acquisition was repeated 100 times for a total scan time of 2 min and 41 sec, corresponding to a temporal resolution of 1.61 s. A bolus of 0.1 mmol/kg of GD-DTPA was injected 80 s after the scan started.



## About the NCI QIN

The mission of the QIN is to improve the role of quantitative imaging for clinical decision making in oncology by developing and validating data acquisition, analysis methods, and tools to tailor treatment for individual patients and predict or monitor the response to drug or radiation therapy. More information is available on the [Quantitative Imaging Network Collections](#) page. Interested investigators can apply to the QIN at: [Quantitative Imaging for Evaluation of Responses to Cancer Therapies \(U01\) PAR-11-150](#).

### Data Access

## Data Access

This is a **limited access** data set. To request access, please contact [help@cancerimagingarchive.net](mailto:help@cancerimagingarchive.net). Once access is granted, click the **Download** button to save a ".ctia" manifest file to your computer, which you must open with the [NBIA Data Retriever](#). Click the **Search** button to open our Data Portal, where you can browse the data collection and/or download a subset of its contents.

Data Type	Download all or Query/Filter
Images (DICOM, 33.5 GB)	 

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### Detailed Description

## Detailed Description

Collection Statistics	
Modalities	MR
Number of Patients	54
Number of Studies	106
Number of Series	1,942
Number of Images	589,314
Images Size (GB)	33.5

### Citations & Data Usage Policy

## Citations & Data Usage Policy

This is a **limited access** data set. Upon receiving access you may only use it for the purposes outlined in your request to the data provider. You are not allowed to redistribute the data or use it for other purposes. See TCIA's [Data Usage Policies and Restrictions](#) for additional details. Questions may be directed to [help@cancerimagingarchive.net](mailto:help@cancerimagingarchive.net).

**Please be sure to include the following citations in your work if you use the data set:**

### **i** Data Citation

Artem B. Mamonov, Jayashree Kalpathy-Cramer. (2016). Data From QIN GBM Treatment Response. The Cancer Imaging Archive. <http://doi.org/10.7937/K9/TCIA.2016.nQF4gpn2>

### **i** Publication Citation

Jafari-Khouzani, K., Emblem, K. E., Kalpathy-Cramer, J., Bjørnerud, A., Vangel, M. G., Gerstner, E. R., ... Stufflebeam, S. M. (2015, June). Repeatability of Cerebral Perfusion Using Dynamic Susceptibility Contrast MRI in Glioblastoma Patients. *Translational Oncology*. Elsevier BV. <http://doi.org/10.1016/j.tranon.2015.03.002>. ([link](#))

### **i** Publication Citation

Prah, M. A., Stufflebeam, S. M., Paulson, E. S., Kalpathy-Cramer, J., Gerstner, E. R., Batchelor, T. T., ... Schmainda, K. M. (2015, June 11). Repeatability of Standardized and Normalized Relative CBV in Patients with Newly Diagnosed Glioblastoma. *American Journal of Neuroradiology*. American Society of Neuroradiology (ASNR). <http://doi.org/10.3174/ajnr.a4374> ([link](#))

### **i** TCIA Citation

Clark K, Vendt B, Smith K, Freymann J, Kirby J, Koppel P, Moore S, Phillips S, Maffitt D, Pringle M, Tarbox L, Prior F. **The Cancer Imaging Archive (TCIA): Maintaining and Operating a Public Information Repository**, *Journal of Digital Imaging*, Volume 26, Number 6, December, 2013, pp 1045-1057. ([paper](#))



**In addition, please include the following citations in your work if you use the DSC component of the data set:**

## Other Publications Using This Data

TCIA maintains [a list of publications](#) that leverage our data. At this time we are not aware of any additional publications based on this data. If you have a publication you'd like to add, please [contact the TCIA Helpdesk](#).

### Versions

#### Version 1 (Current): Updated 2015/08/12

Data Type	Download all or Query/Filter
Images (DICOM, 33.5GB)	<div data-bbox="496 621 695 680">Download</div> <div data-bbox="701 621 863 680">Search</div> <p data-bbox="496 722 1002 751">(Download requires the <a href="#">NBIA Data Retriever</a>.)</p>