

Domanda estratta n. 1

**AVVISO PUBBLICO, PER TITOLI E COLLOQUIO, PER L'ASSUNZIONE A TEMPO DETERMINATO DI N. 1 RISORSA NEL PROFILO DI RICERCATORE SANITARIO, CATEGORIA DS, PER LAUREATI IN FISICA (LM-17) DA ASSEGNARE AL DIPARTIMENTO CLINICO SPERIMENTALE DERMATOLOGIA UOSD RADIOLOGIA A INDIRIZZO DERMATOLOGICO DELL'ISTITUTO SAN GALLICANO - PROGETTO CODICE GR-2019-12369697 - P.I. DR. ANTONINO GUERRISI**

**PROVA COLLOQUIO**

**14 MARZO 2024 h 10:30**

**Domande tecniche**

- 1) Fornire una definizione di radiomica
- 2) Come si risolve lo sbilanciamento delle classi di un dataset in analisi radiomica



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**PROVA COLLOQUIO**

**14 MARZO 2024 H 10:30**

**Domande di informatica**

- 1) Cos'è un database?
- 2) Cos'è Word?

*[Handwritten scribbles and initials]*





# Dual-mode ultrasound radiomics and intrinsic imaging phenotypes for diagnosis of lymph node lesions

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**Contributions:** (I) Conception and design: M Chen, Q Zhang; (II) Administrative support: None; (III) Provision of study materials or patients: J Jiang, W Chang; (IV) Collection and assembly of data: Y Chen, J Shi, J Shi; (V) Data analysis and interpretation: All authors; (VI) Manuscript writing: All authors; (VII) Final approval of manuscript: All authors.

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**Background:** The ultrasonic diagnosis of lymph node lesions is usually based on a small number of subjective visual features from a single ultrasonic modality, which limits diagnostic accuracy. Therefore, our study aimed to propose a computerized method for using dual-mode ultrasound radiomics and the intrinsic imaging phenotypes for accurately differentiating benign, lymphomatous, and metastatic lymph nodes.

**Methods:** A total of 543 lymph nodes from 538 patients were examined with both B-mode ultrasonography and elastography. The data set was randomly divided into a training set of 407 nodes and a validation set of 136 nodes. First, we extracted 430 radiomic features from dual-mode images. Then, we combined the least absolute shrinkage and selection operator with the analysis of variance to select several typical features. We retrieved the intrinsic imaging phenotypes by using a hierarchical clustering of all radiomics features, and we integrated the phenotypes with the selected features for the classification of benign, lymphomatous, and metastatic nodes.

**Results:** The areas under the receiver operating characteristic curves (AUCs) on the validation set were 0.960 for benign *vs.* lymphomatous, 0.716 for benign *vs.* metastatic, 0.933 for lymphomatous *vs.* metastatic, and 0.856 for benign *vs.* malignant.

**Conclusions:** The radiomics features and intrinsic imaging phenotypes derived from the dual-mode ultrasound can capture the distinctions between benign, lymphomatous, and metastatic nodes and are valuable in node differentiation.

**Keywords:** Lymph nodes; ultrasound; dual mode; radiomics; intrinsic imaging phenotypes

Submitted Dec 25, 2019. Accepted for publication May 29, 2020.

doi: 10.21037/atm-19-4630

View this article at: <http://dx.doi.org/10.21037/atm-19-4630>

## Introduction

Lymph nodes are essential organs that regulate the core functions of the immune system. Lymph nodes are widely present throughout the human body and allow for the trapping and presentation of foreign antigens from

peripheral tissues to prime the adaptive immune response (1). Lymph node lesions are divided into benign lesions and malignant lesions, of which, the malignant lesions are further subdivided into lymphoma and metastatic cancer (2). The precise diagnosis of benign lymph nodes,

