

Natural staining-aided cytology: A potential ally of pathologists for early diagnosis of pathological lesions in remote and unequipped setups

Dear Editor,

Ever since its emergence, histopathology has consistently played a substantial part in disease diagnosis. This procedure has managed to become a prime tool that forms the backbone of confirmatory tests adopted to identify human body pathologies. Not only is this, but it is also a type of analytical process critical to get insight into the overall patient prognosis and follow-up care as well. Unfortunately, despite all the perks offered by this diagnostic procedure, it is technically impossible to establish a full-fledged histopathological laboratory in rural areas or low-income regions. The lack of funds to procure all the necessary armamentarium required to establish a well-equipped functional setup is one of the major reasons for this. The high cost of the reagents and stains, logistic charges to make things available in rural areas and availability of trained technicians add on to this. Furthermore, the possible invasiveness of pathological tests makes people anxious and, hence, is less acceptable by the commoners.^[1]

To overcome these barriers, stains derived from natural substances can become armour. Because these stains are natural organic products, they not only reduce the chemical load in routine laboratories but are also cost-effective, thereby making them the most suitable staining agents for use in a rural setting. Experimental research conducted in recent years to determine the efficacy of these natural stains in staining routine histopathological slides backs up these claims with positive results being obtained. Pomegranate, kumkum, henna, beetroot, turmeric, ginger and many other natural staining agents are widely mentioned in the current literature.^[2] The most commonly used ones include turmeric and ginger, which have given positive results in almost 80% of the cases. According to a systematic review of 13 studies conducted on natural stains, around 58.84% of the studies stated that watery extracts from natural substances are considerably good sources and have the potential to substitute routine haematoxylin and eosin (H&E) stains.^[3]

When the invasiveness of a routine biopsy procedure to prepare a histopathological slide is considered, cytological

smears (exfoliative cytology or scrape cytology) are an excellent alternative. It is simple, non-invasive and relatively inexpensive. The main aim of cytology is to study individual cells as the functional unit of life. Smears can be made by taking scrapings from sites such as mouth or vagina, or alternatively from the exfoliated cells in gastric fluid, urine, sputum, pleural fluid, peritoneal fluid, saliva, etc., One particular smear of great significance is the Papanicolaou (Pap) test, which is primarily used for cervical cancer screening. Cytological samples are known to have an efficacy rate of 78% in the diagnosis of malignancies.^[4] Not limiting to this, cytological smears facilitate the detection of a myriad of other conditions such as ameloblastoma, lichen planus and pemphigus. Fine-needle aspiration cytology (FNAC), which finds its use in diagnosing numerous health conditions, has a specificity and sensitivity rate of 75% and 61.5%, respectively.^[5] Above all, along with being efficient, cytological tests can be conducted even in a setup with limited resources such as health check-up camps in rural areas.

Thus, it would not be wrong to state that when natural stains are combined with cytological smear techniques, basic pathological services can be provided in rural and economically less fortunate areas of the world. As cytology allows pathologists to identify early cellular changes, this could lead to early identification and timely treatment initiation. Hand in hand will come a downturn in the undiagnosed cases with poor prognosis of a variety of unfortunate health conditions such as ameloblastoma, lichen planus and certain cancers. A combination of the aforementioned techniques is both economically and functionally satisfactory. Nevertheless, it is imperative to acknowledge that in certain instances this hybrid technique may not be enough to confirm the diagnosis and the case might need routine H&E staining or special staining techniques [Figure 1].

Although there is a considerable amount of data available on the laboratory-based efficacy of this natural staining procedure, more clinical trials would be needed before this novel technique of natural stains and cytological smears

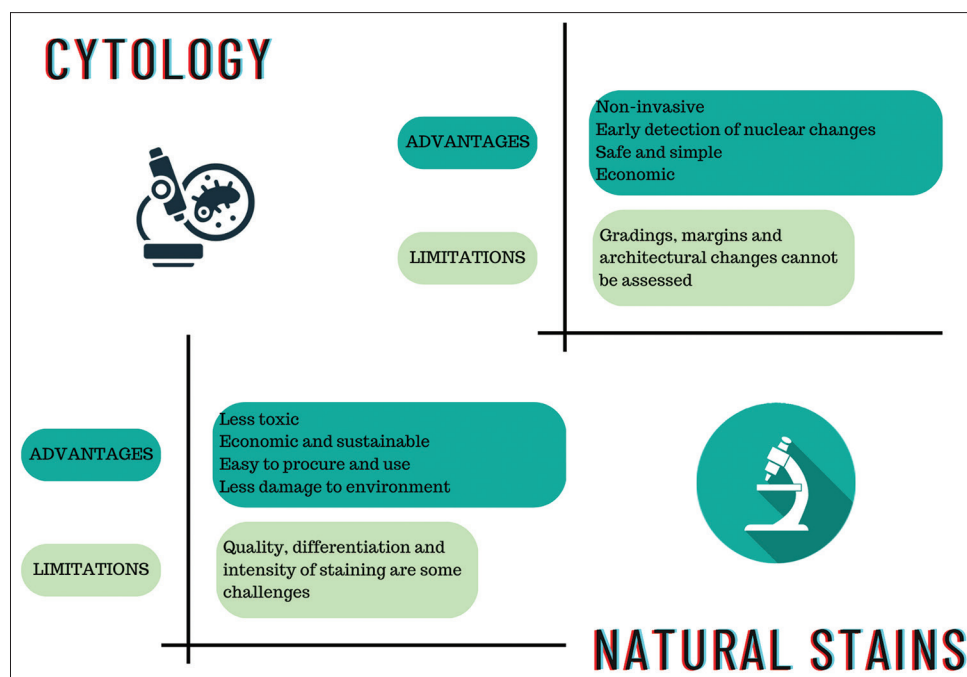


Figure 1: Advantages and limitations of natural stains and cytology

could be used to substitute the age-old conventional techniques of biopsy and H&E staining in routine histopathological laboratories. Nonetheless, such a combination, when implemented, has the potential to improve the current state of the global healthcare system by facilitating mass screening and preventive care diagnostics, particularly in remote and economically less fortunate areas. However, such a technique should not be restricted to rural areas. In technologically advanced setups where proper aids and execution techniques are available, this hybrid method has the potential to produce enhanced results that can be standardised to offer benefit across all spheres.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Sayem A. Mulla, Minakshi Bhattacharjee¹,
Sarita Shrivastava², Ashwini Panchmahalkar¹

Departments of Dentistry, ¹Microbiology, ²Pathology and Bharati Vidyapeeth (Deemed to be University) Dental College and Hospital, Navi Mumbai, Maharashtra, India

Address for correspondence: Dr. Sayem A. Mulla,
Department of Dentistry, Bharati Vidyapeeth (Deemed to be University)
Dental College and Hospital, Navi Mumbai, Maharashtra, India.
E-mail: sayemmullaa@gmail.com

Submitted: 09-Aug-2023, **Accepted:** 24-Aug-2023, **Published:** 20-Dec-2023

REFERENCES

1. Sayed S, Lukande R, Fleming KA. Providing pathology support in low-income countries. *J Glob Oncol* 2015;1:3-6.
2. Sachdev SS, Chettiankandy TJ, Sonawane SG, Sardar MA, Kende PP, Pakhmode V. Toward developing natural histologic stains using anthocyanins: A novel approach. *J Oral Maxillofac Pathol* 2021;25:199.
3. Mohandas R, Ramani P, Sherlin HJ, Gheena S, Ramasubramanian A, Don KR, et al. Organic stains used in histopathology-A systematic review. *Drug Invent Today* 2019;11:426-32.
4. Shukla S, Malhotra KP, Husain N, Gupta A, Anand N. The utility of cytology in the diagnosis of adenocarcinoma lung: A tertiary care center study. *J Cytol* 2015;32:159-64.
5. Sood A, Mishra D, Yadav R, Bhatt K, Priya H, Kaur H. Establishing the accuracy of a new and cheaper sample collection tool: Oral cytology versus oral histopathology. *J Oral Maxillofac Pathol* 2020;24:52-6.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Access this article online	
Quick Response Code:	Website: https://journals.lww.com/JPAT/
	DOI: 10.4103/jomfp.jomfp_348_23

How to cite this article: Mulla SA, Bhattacharjee M, Shrivastava S, Panchmahalkar A. Natural staining-aided cytology: A potential ally of pathologists for early diagnosis of pathological lesions in remote and unequipped setups. *J Oral Maxillofac Pathol* 2023;27:746-7.

© 2023 Journal of Oral and Maxillofacial Pathology | Published by Wolters Kluwer -Medknow