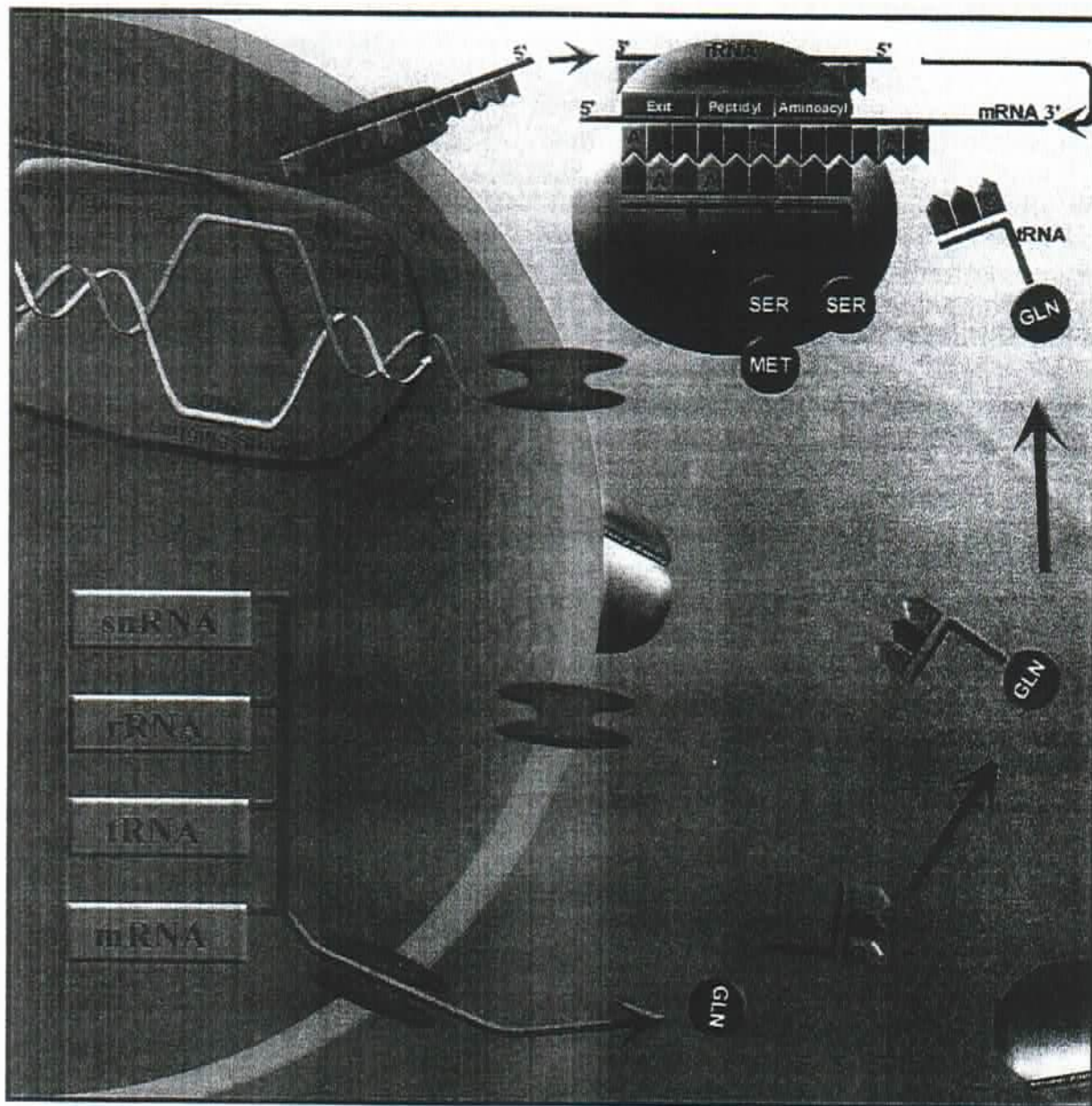


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**Biomarker-Based Telecytopathology: A New Prospective for Global Cervical Cancer Control**

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**Abstract**

**INTRODUCTION:** Cytological screening and the Pap test remain the most successful cervical cancer prevention strategy. However, only 6.5% of 1.7 billion women at risk worldwide receive screening and 250,000 women die each year from a preventable disease in the 21<sup>st</sup> Century. The main reasons for this "failure" are the cost of Pap test and the lack of infrastructure and qualified personnel to perform the screening. The new WHO strategy "See & Treat" and HPV testing are less effective than the Pap test. A biomarker-based telecytopathology (e.g. MarkPap™ Digital), a combination of biomarker cytology, digital imaging and networking via Internet, could provide an accurate, fast, low cost and affordable cervical cancer screening for low-resource areas worldwide.

**METHOD:** We have combined the first-line MarkPap® technology products with commercially available instruments (each of them fit-for-use in this application) with user-friendly software. We are now learning how to combine all of them in an integrative device with potentials for use in mass screening of cytological specimens. At this moment, we have combined an assembly of instruments including an Image Acquisition Module (microscope with digital camera, PC with image capturing, storing and image delivering ability), an Image Transfer Module (a central server to accept images from many remote sites, make them available for review of pathologists, and to report results instantly).

**RESULTS:** In a pilot study, we acquired images from existing microscopic slides (from the MarkPap Library of Slides), processed them through this multi-modular device, and compared cytological results obtainable from images with those already determined on microscopic slides. We found the system is amenable to the intended use after some software modification and method optimization. We have created and transferred images around the world with little deformation. We will confirm the system once we complete the analysis of 500 slides (all T categories) and compare results of pathologists' review of slides and images.

**CONCLUSION:** Current results warrant continuation of this translational research. We expect this research, when completed, to introduce a prototype of a new digital image device for mass cervical cancer screening in low-resource areas, particularly in developing countries.

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