

## Worse Outcome in Primary Glioblastoma Multiforme With Concurrent Epidermal Growth Factor Receptor and p53 Alteration

Yolanda Ruano<sup>1</sup>, Teresa Ribalta, PhD, MD<sup>2</sup>, Ángel Rodríguez de Lope, PhD, MD<sup>3</sup>, Yolanda Campos-Martín, PhD<sup>1</sup>, Concepción Fiaño, MD<sup>4</sup>, Elisa Pérez-Magán<sup>1</sup>, José-Luis Hernández-Moneo, MD<sup>3</sup>, Manuela Mollejo, PhD, MD<sup>1,5</sup> and Bárbara Meléndez, PhD<sup>1</sup>

+ Author Affiliations

### Abstract

Primary glioblastoma multiforme (GBM), in contrast with secondary GBM, has been associated with the presence of *EGFR* amplification and absence of *p53* mutation. In this study, we analyzed relevant molecular and clinical variables in 194 primary GBMs and tested them for survival analysis. Although most of the tumors showed a mutually exclusive pattern, concurrent alterations of EGFR and p53 were detected. Survival analysis of *CDK4* amplification revealed a highly significant association with a worse clinical outcome ( $P = .01$ ), whereas MDM2, CDK6, PTEN, and p21 were not associated with patient survival. Multivariate analysis including the significant clinical and molecular variables revealed *CDK4* amplification, age, and radiotherapy to be markers with independent prognostic value. In addition, the primary GBM tumors showing simultaneous EGFR and p53 alterations were significantly associated with worse survival ( $P < .01$ ). These results highlight the prognostic value of *CDK4* amplification and of simultaneous EGFR-p53 alterations in the clinical outcome of patients with primary GBM.

Key Words:

Glioblastoma EGFR p53 CDK4 Survival

### Footnotes

Supported in part by grants FIS-02/3006, PI070662, CA07/00119, and INT 07/028 from the Fondo de Investigaciones Sanitarias, Madrid; and JI05012, FISCAM PI-2006/29, and SESCOAM 04032 from the Consejería de Sanidad Junta de Comunidades de Castilla-La Mancha, Toledo.

Copyright© by the American Society for Clinical Pathology