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Authors: Naila Rabbani, Mingzhan Xue, Martin O. Weickert, Paul J. Thornalley

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Multiple roles of glyoxalase 1-mediated suppression of methylglyoxal glycation in cancer biology – involvement in tumour suppression, tumour growth, multidrug resistance and target for chemotherapy

Naila Rabbani,[1,2] Mingzhan Xue, [1] Martin O Weickert[1,3] and Paul J. Thornalley[1,2]

[1]Clinical Sciences Research Laboratories, Warwick Medical School, University of Warwick, University Hospitals, Coventry CV2 2DX, U.K., [2]Warwick Systems Biology Centre, Senate House, University of Warwick, Coventry CV4 7AL, U.K. and [3]The ARDEN NET Centre, ENETS Centre of Excellence, University Hospitals Coventry & Warwickshire NHS Trust CV2 2DX, U.K.

Correspondence should be addressed. Email: P.J.Thornalley@warwick.ac.uk

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ABSTRACT

Glyoxalase 1 (Glo1) is part of the glyoxalase system in the cytoplasm of all human cells. It catalyses the glutathione-dependent removal of the endogenous reactive dicarbonyl metabolite, methylglyoxal (MG). MG is formed mainly as a side product of anaerobic glycolysis. It modifies protein and DNA to form mainly hydroimidazolone MG-H1 and imidazopurinone MGdG adducts, respectively. Abnormal accumulation of MG, dicarbonyl stress, increases adduct levels which may induce apoptosis and replication catastrophe. In the non-malignant state, Glo1 is a tumour suppressor protein and small molecule inducers of