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Yasushi Nakamura, Hironao Yasuoka, Hui Zuo, Yuuki Takamura, Akira Miyauchi, Misa Nakamura, and Kennichi Kakudo

### **Nitric Oxide in Papillary Thyroid Carcinoma: Induction of Vascular Endothelial Growth Factor D and Correlation with Lymph Node Metastasis**

J Clin Endocrinol Metab 2006; 91: 1582-1585

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### ▼ Nitric oxide, vascular endothelial growth factor and angiotensin in papillary thyroid carcinoma

Julian E Donckier, Luc A Michel (21 April 2006)

## Nitric oxide, vascular endothelial growth factor and angiotensin in papillary thyroid carcinoma

21 April  
2006



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[Re: Nitric oxide, vascular endothelial growth factor and angiotensin in papillary thyroid carcinoma](#)

[Email](#) Julian E Donckier,  
et al.

We read with interest the nice study by Nakamura Y et al (1) showing a role for nitric oxide (NO) in stimulating vascular endothelial growth factor (VEGF)-D, which was associated lymph node metastasis in papillary thyroid carcinoma (PTC). These results are in line with our recent study (2), demonstrating an overexpression of NO synthases (NOS2 and NOS3) as well as of VEGF and its receptors (VEGFR-1 and VEGFR-2) in 8 surgical samples of PTC. Furthermore, we found an overexpression of angiotensin-2 (and of its receptor Tie-2), that was correlated with NOS2 and NOS3 expressions. Because angiotensin-2 and VEGF act synergistically (3), we wonder whether an activation of the angiotensin system could occur in concert with VEGF and be involved in the angiogenesis and lymphangiogenesis of PTC. We want to stress that NO is probably not the only pathway implicated in the pathogenesis of PTC since an overexpression of the endothelin system has also been demonstrated (4).

### References

1. Nakamura Y, Yasuoka H, Zuo H, Takamura Y, Miyauchi A, Nakamura M, Kakudo K. 2006. Nitric oxide in papillary thyroid carcinoma: induction of vascular endothelial growth factor D and correlation with lymphnode metastasis. J Clin Endocrinol Metab 91:1582-1585

2. Donckier JE, Michel M, Delos M, Havaux X, Van Beneden R.

2006. Interrelated overexpression of endothelial and inducible nitric oxide synthases, endothelin-1 and angiogenic factors in human papillary thyroid carcinoma. Clin Endocrinol, in press

3. Visconti RP, Richardson CD, Sato TN. 2002. Orchestration of angiogenesis and arteriovenous contribution by angiopoietins and vascular endothelial growth factor (VEGF) Proc Natl Acad Sci USA 99:8219-8224

4. Donckier J, Michel L, Van Beneden R, Delos M, Havaux X. 2003. Increased expression of endothelin-1 and its mitogenic receptor ETA in human papillary thyroid carcinoma. Clin Endocrinol 59:354-360