

FEATURED GUEST LECTURE**Potential Future Advances in Ophthalmology from Research in Tumor Angiogenesis**

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PURPOSE

Neovascular diseases of the eye comprise the most common cause of blindness. Pathological microvessels in the eye can grow rapidly or can remain stable for long periods of time. These vessels can invade normal tissues in the eye. Their hyperpermeability can lead to local edema, bleeding, or thrombosis. Administration of FDA-approved angiogenesis inhibitors can reverse virtually all of these phenotypes in animals, and some of them in humans.

METHODS

Human tumors induce similar neovascular phenotypes. Early research in tumor angiogenesis was greatly facilitated by methodology borrowed from ophthalmology. Recent progress in understanding tumor angiogenesis reveals potential fundamental new directions for future angiogenesis research in ophthalmology. For example: (I) Of the 28 endogenous angiogenesis inhibitor proteins in the blood and/or tissues, discovered since 1980, which of these predominately protect against pathological neovascularization in the eye? (II) How is their expression down-regulated during the switch to the angiogenic phenotype? (III) Simple analysis of the platelet angiogenesis proteome can detect angiogenesis regulatory proteins released from microscopic human tumors of 1 mm³ or less in mice.

RESULTS

Could this principle be employed to detect exacerbation or regression of macular degeneration and diabetic retinopathy months or years before conventional methods? For example, after a patient with macular degeneration has completed a course of monthly intraocular injections of an angiogenesis inhibitor, could recurrence of disease progression be detected months or years before symptoms or ophthalmoscopic signs of recurrence, by analysis of the platelet angiogenesis proteome obtained from a simple blood test? (iv) Following intraocular therapy with angiogenesis inhibitors, can recurrence of macular degeneration or diabetic retinopathy be prevented by administration of oral non-toxic, small molecules to induce increased expression of specific endogenous angiogenesis inhibitors in the eye, such as endostatin, thrombospondin-1, or PEDF?

REFERENCES

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