



科學的意外 發現與突破

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Penicillin

One of the biggest medicinal breakthroughs in history came about entirely by accident. Sir Alexander Fleming interrupted his experimentation with the influenza virus for a two week holiday and when he returned he found that a mould had started to grow which deterred the virus. Penicillin was born and is now used to treat everything from acne to pneumonia.

PCR reaction enzyme (TAQ DNA polymerase) 的發現

Pulsatile secretion of anterior pituitary gland hormones 的發現

Plasma LH levels

Sample 1 : 12, 10, 11 ng/ml

Sample 2 : 60, 58, 57 ng/ml

Sample 3 : 41, 40, 39 ng/ml

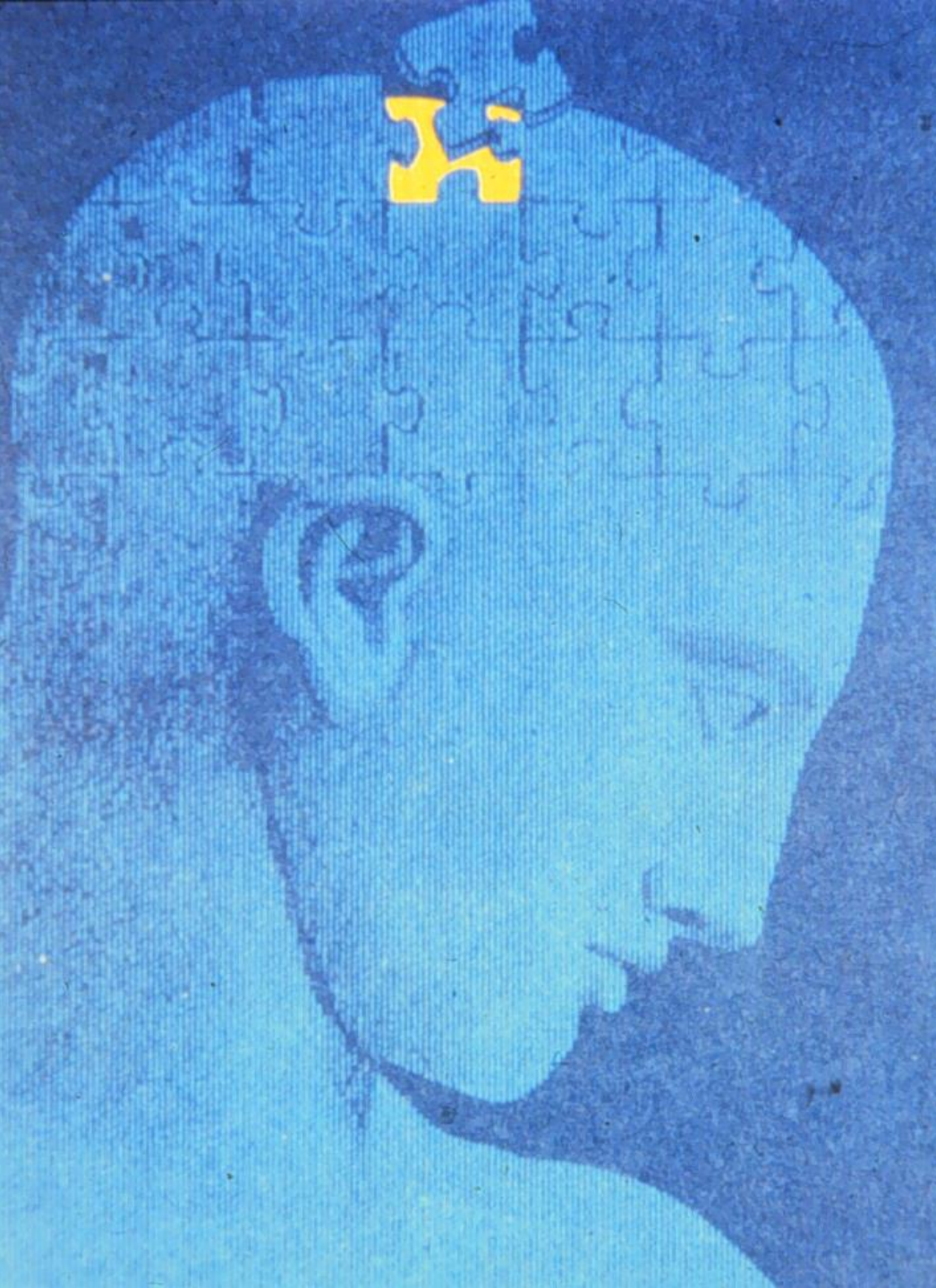
Sample 4 : 63, 63, 62 ng/ml

Sample 5 : 33, 35, 36 ng/ml

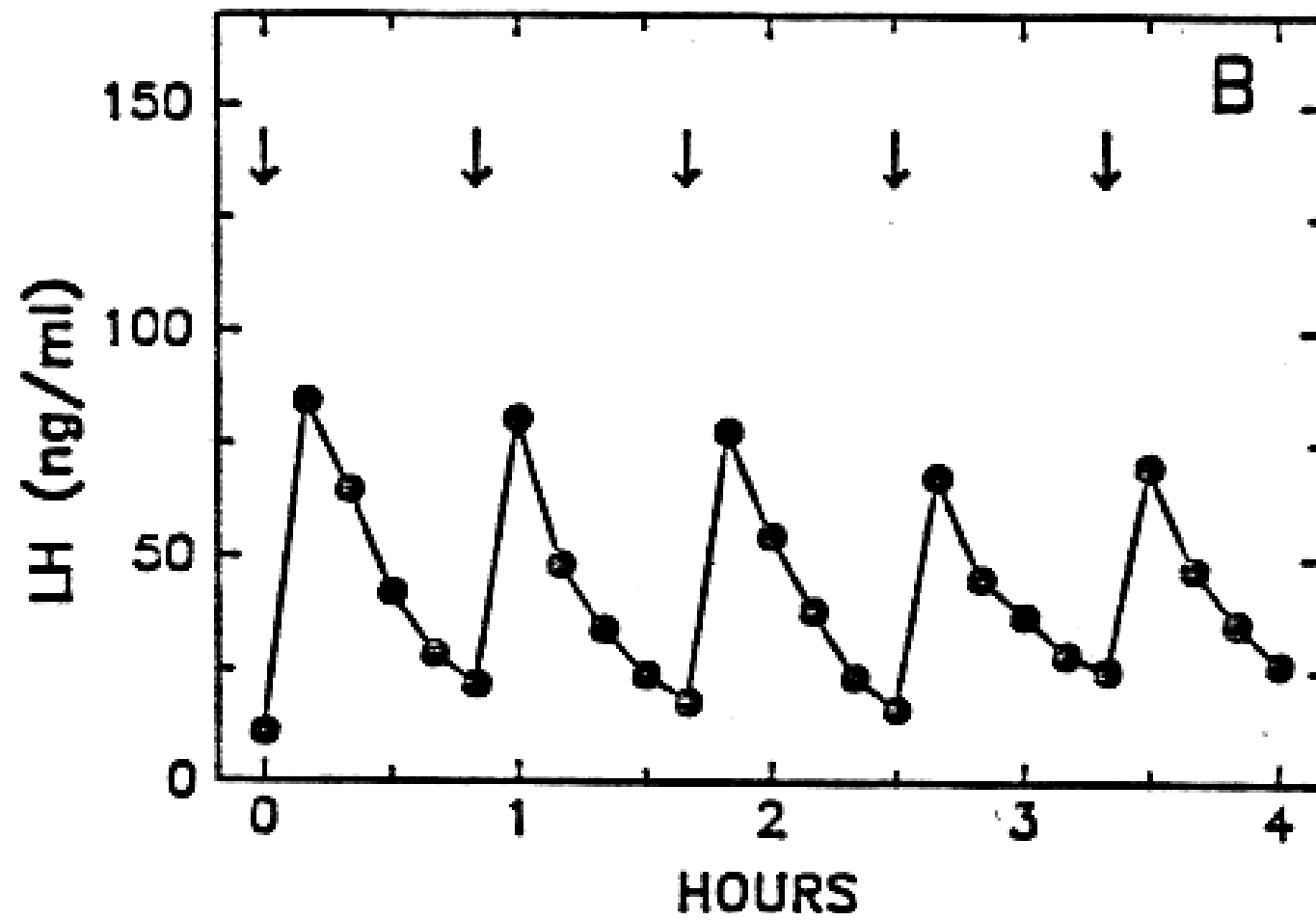
Sample 6 : 22, 23, 22 ng/ml

Accuracy

Consistency



**A piece of puzzle
is missing**



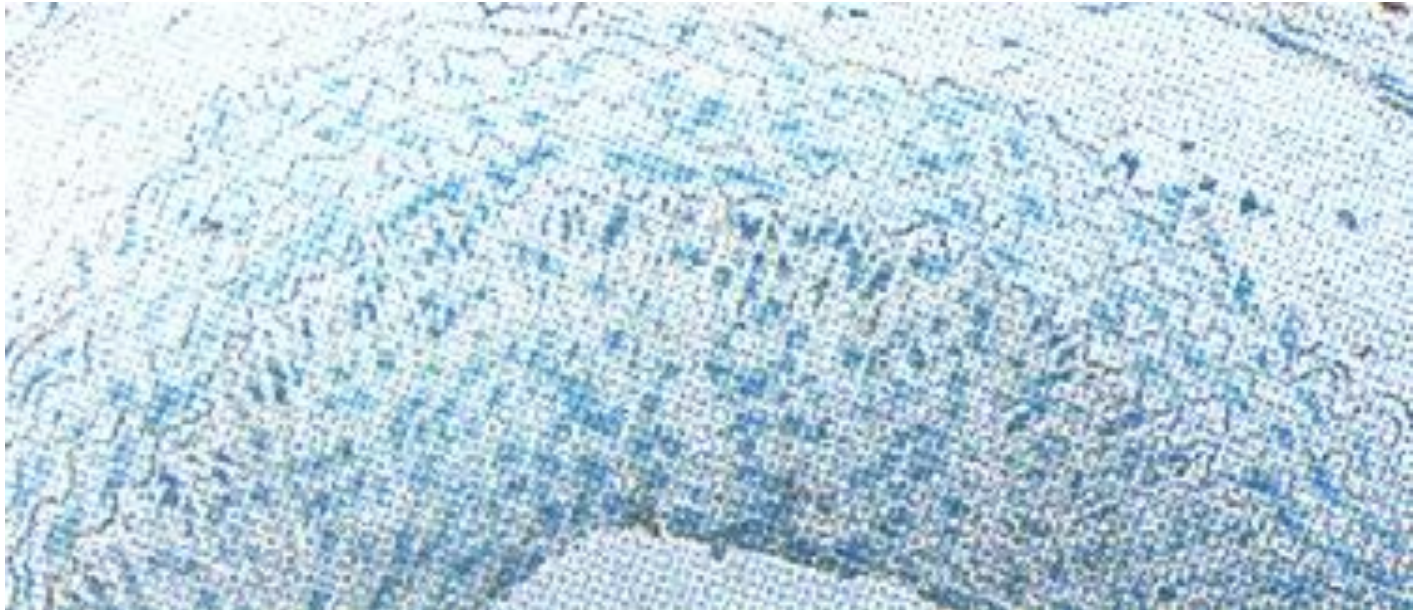
Discovery is seeing what everybody else has seen, and thinking what nobody else has thought.

Albert von Szent-Györgyi Nagyrápolt
1937 年諾貝爾醫學獎

Discovery of Thy-1 molecule as a maker of angiogenesis

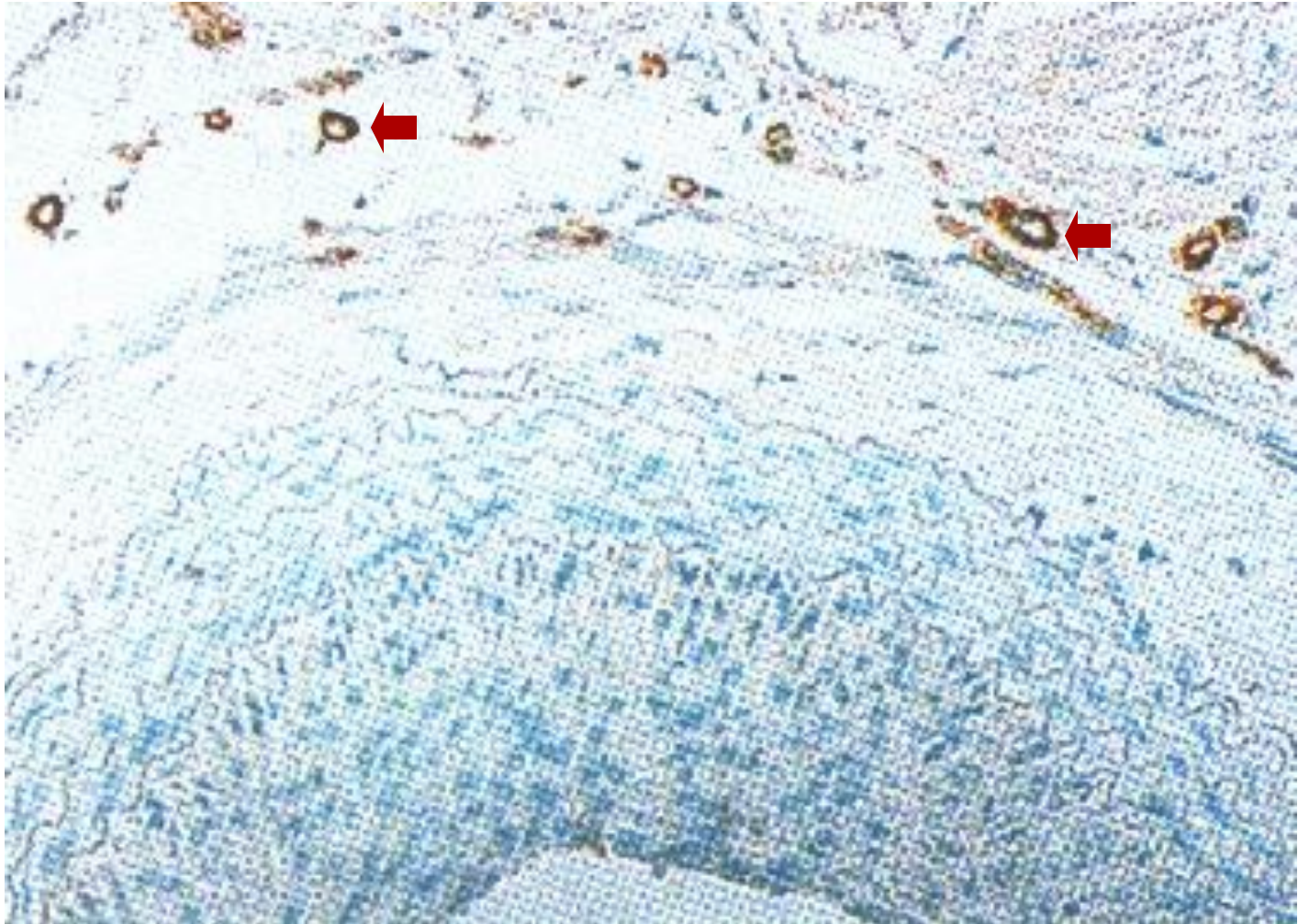
**Can Thy-1 serve as a marker for
smooth muscle cells in neointima?**

Thy-1 immunoreactivity was not detected in the middle layer of the balloon-injured artery rat

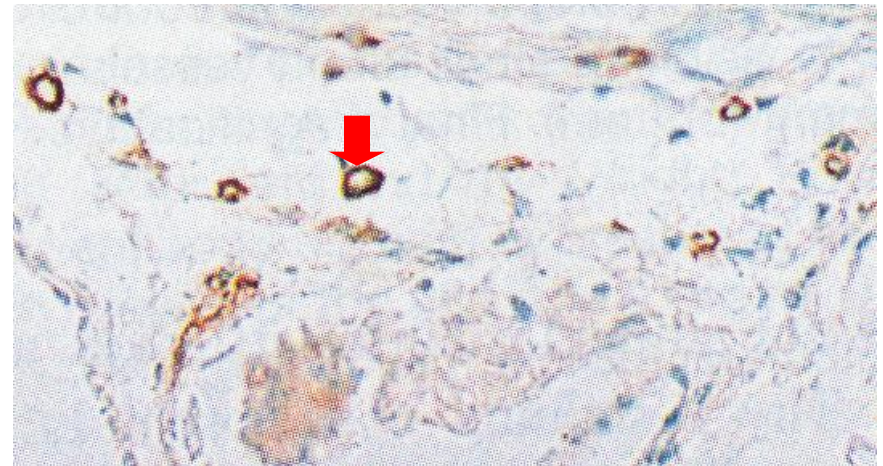
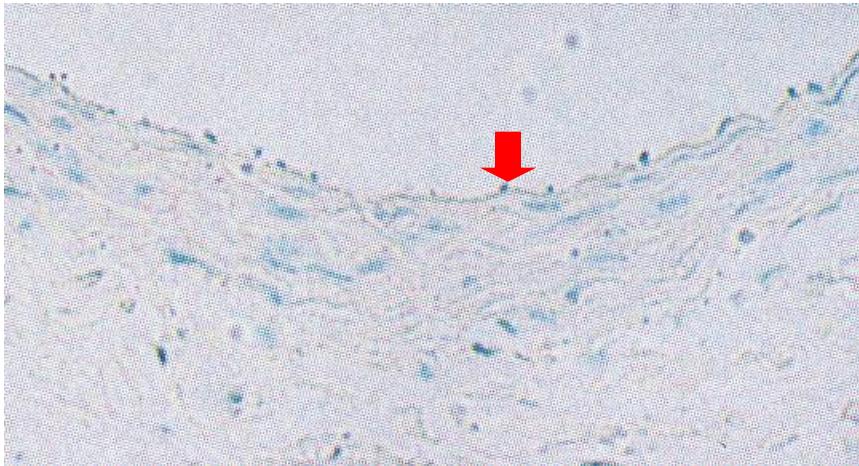
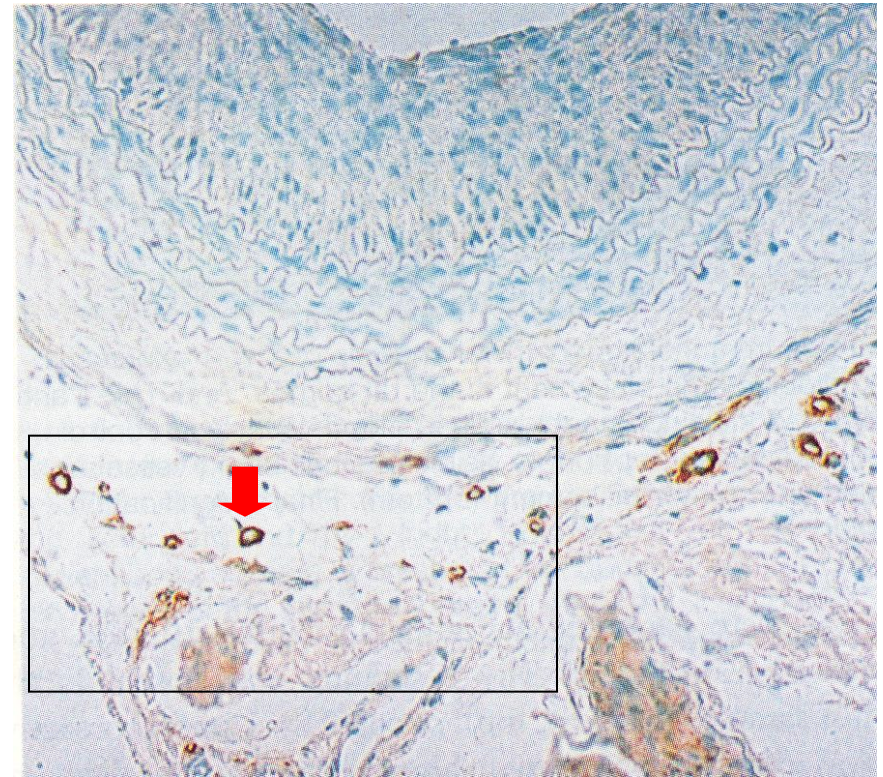
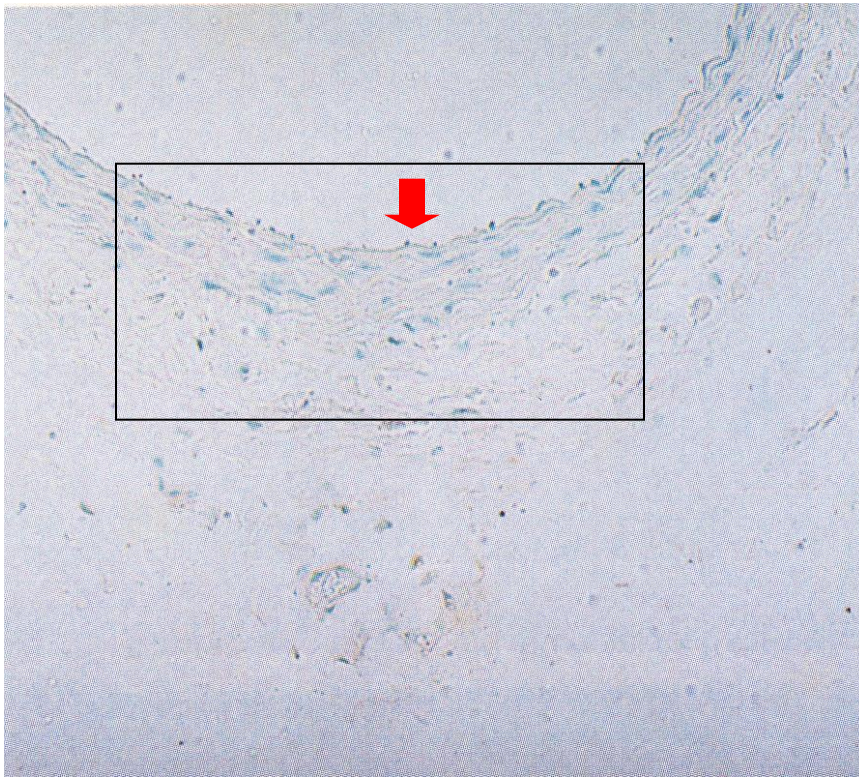


Is this a true negative?

Thy-1 immunoreactivity is detected in the capillary of the balloon-injured artery rat



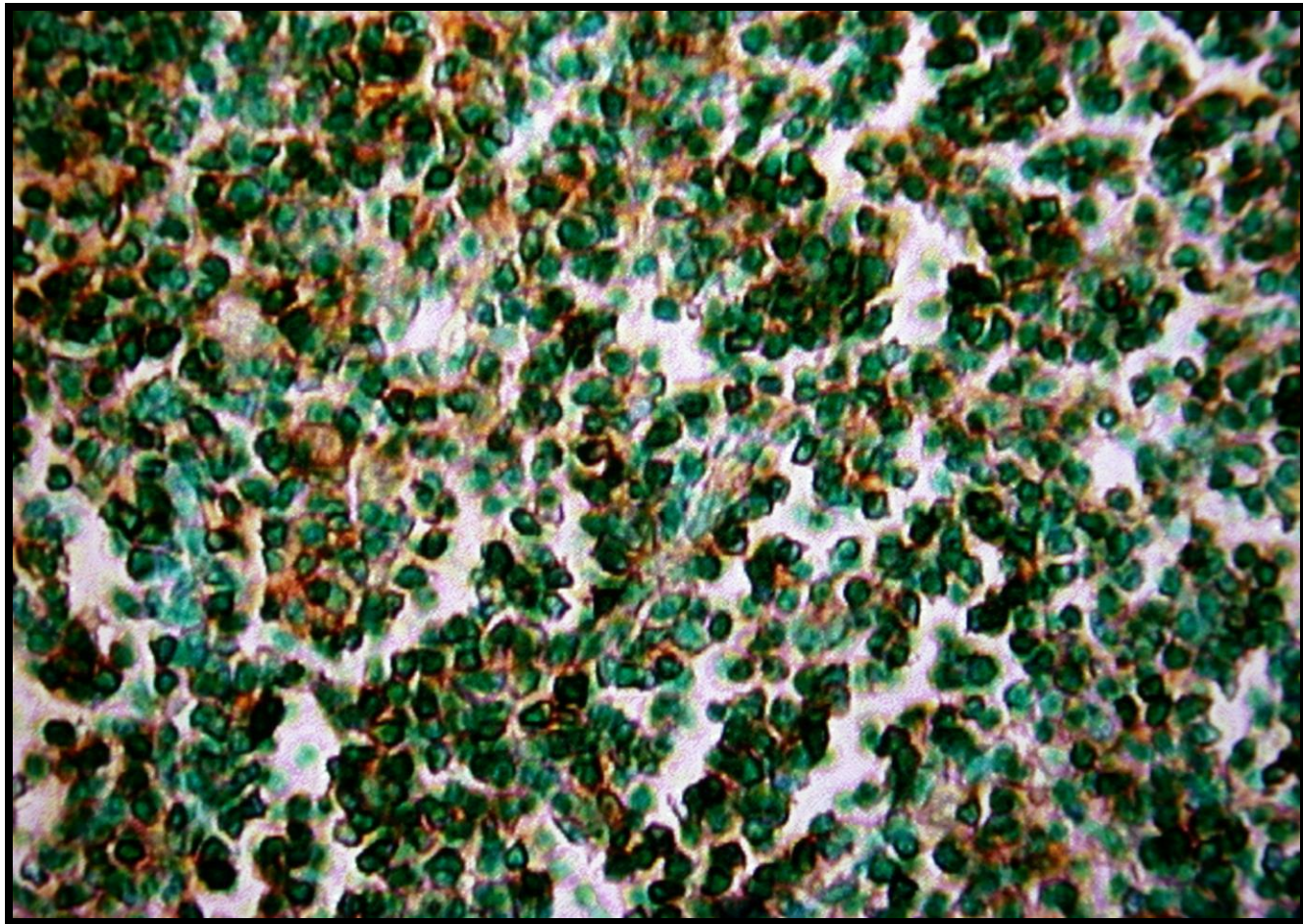
**Does expression of Thy-1 in
vascular endothelial cells
occur only during the process
of angiogenesis?**



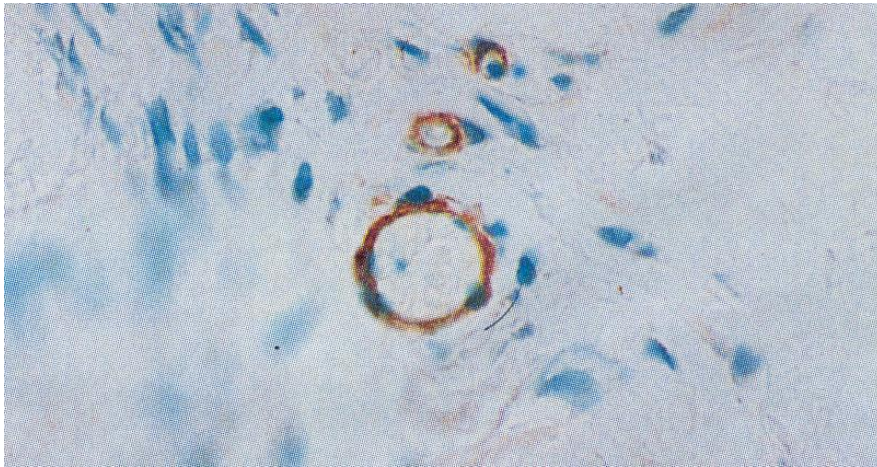
Non-injured carotid artery

Balloon-injured carotid artery

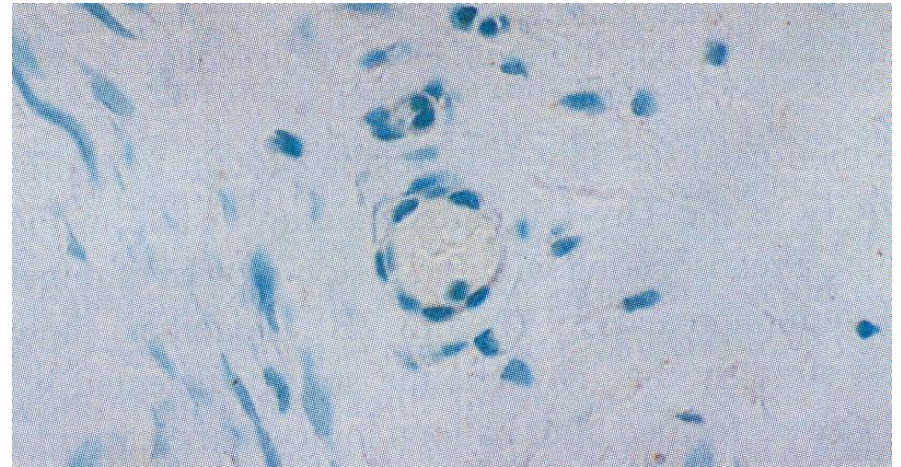
Thy-1 immunoreactivity was detected in the rat thymocytes



Specificity of Thy-1 immunoreactivity



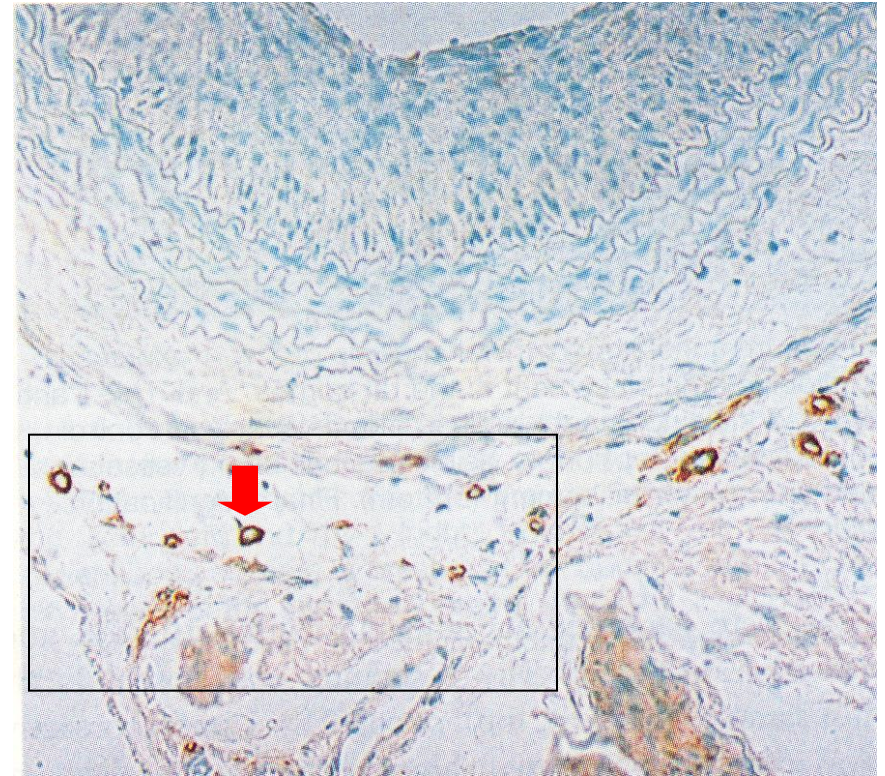
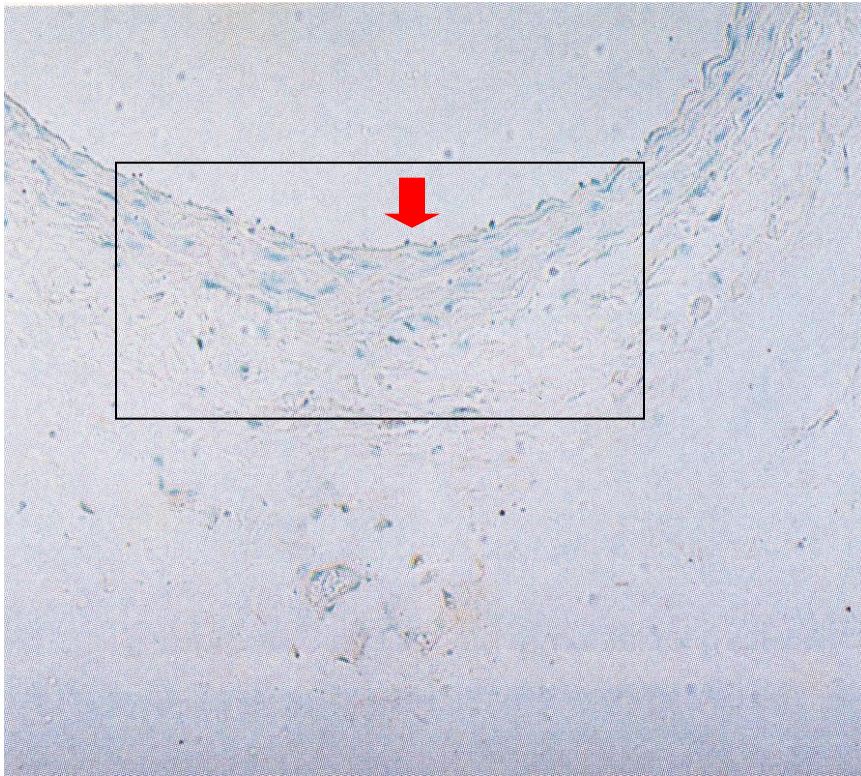
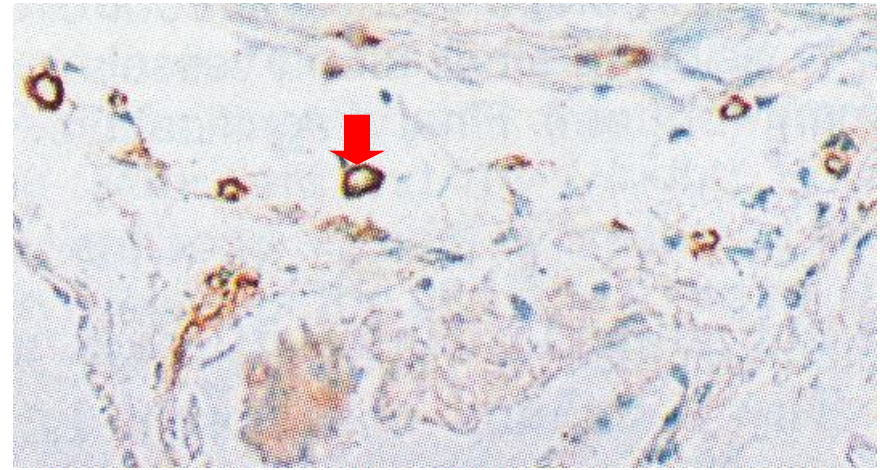
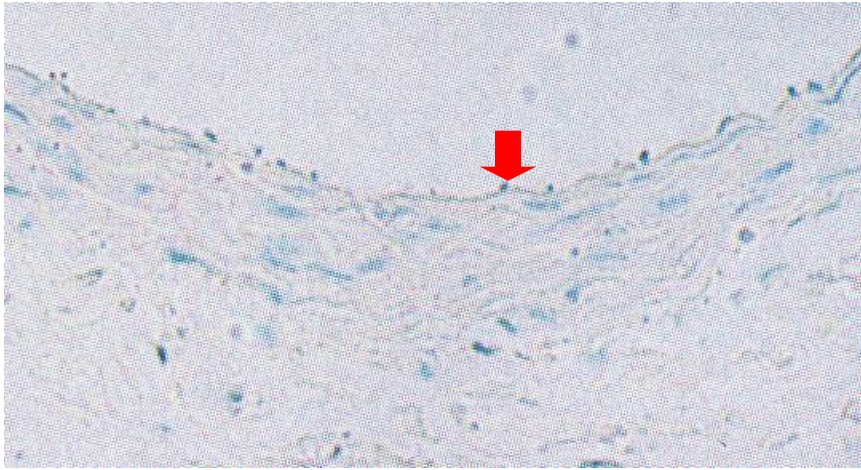
Anti-Thy-1 Ab



Anti-Thy-1 Ab+Thy-1 Ag

Animal models for the studies of angiogenesis

- **Balloon-injured artery**
- **Renal artery ligation**
- **Tumor-implanted cornea**
- **Pregnant uterus**

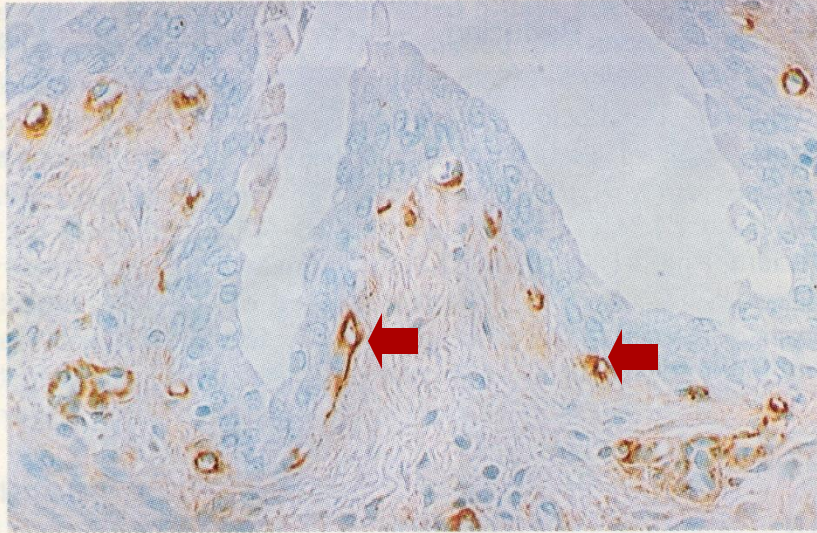


Non-injured carotid artery

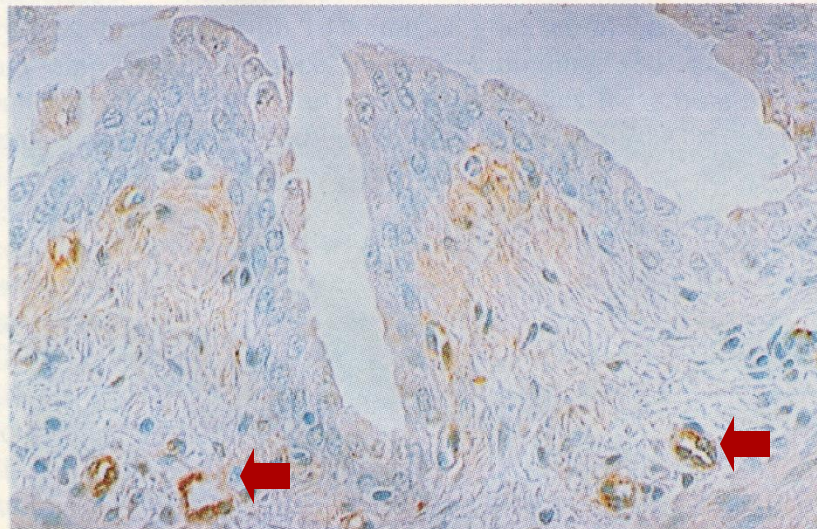
Balloon-injured carotid artery

Angiogenesis in the ureter after renal artery ligation

anti-Thy-1

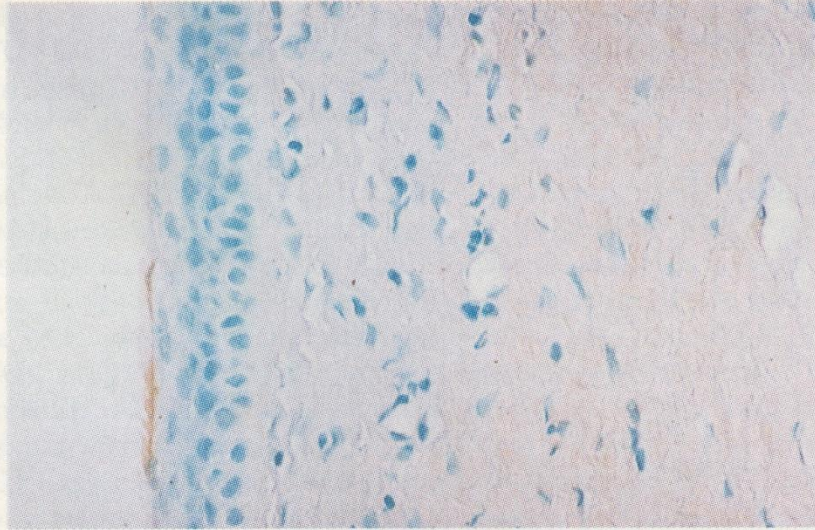


anti-von Willebrand factor

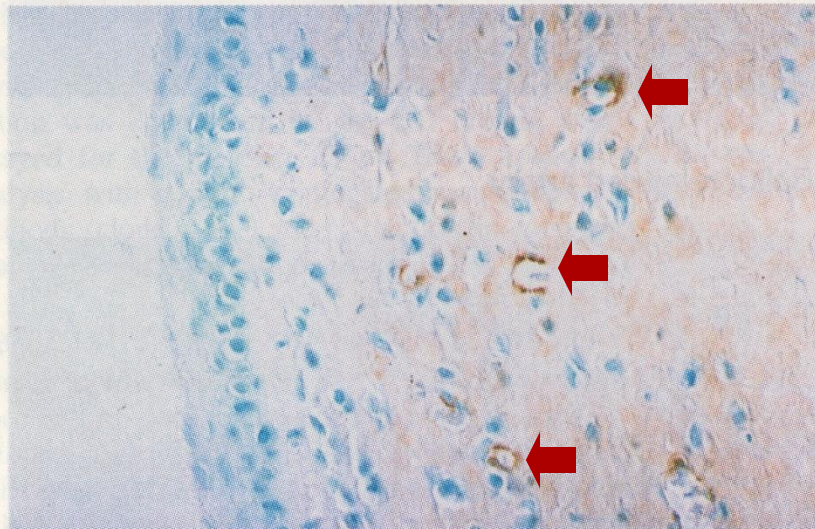


Angiogenesis in the tumor-transplanted cornea

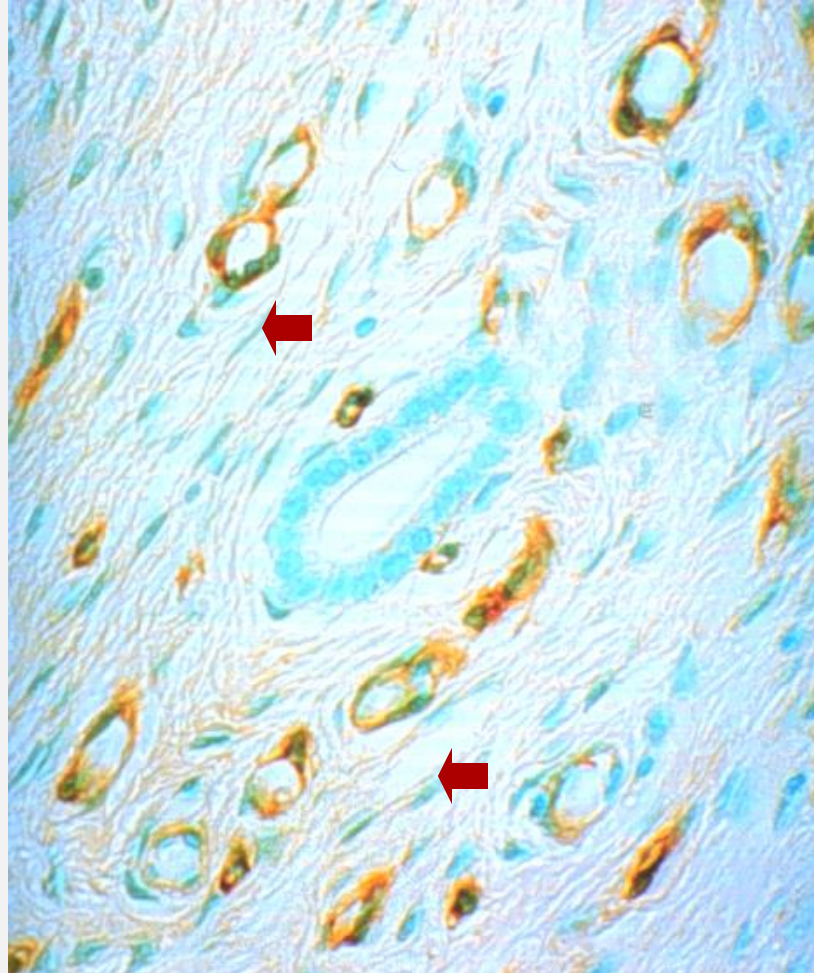
Control eye



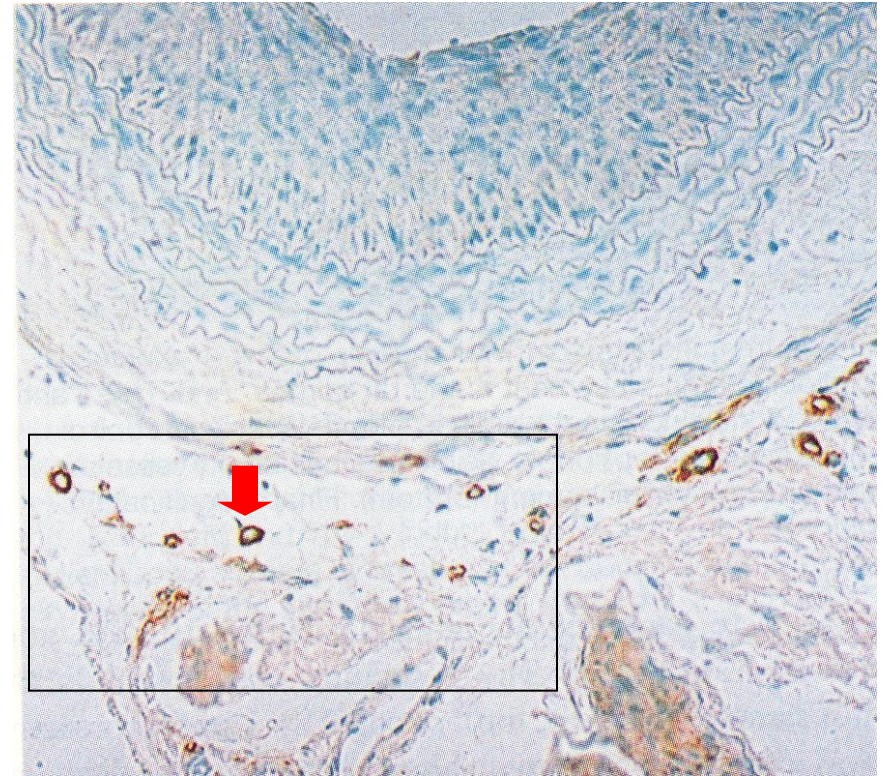
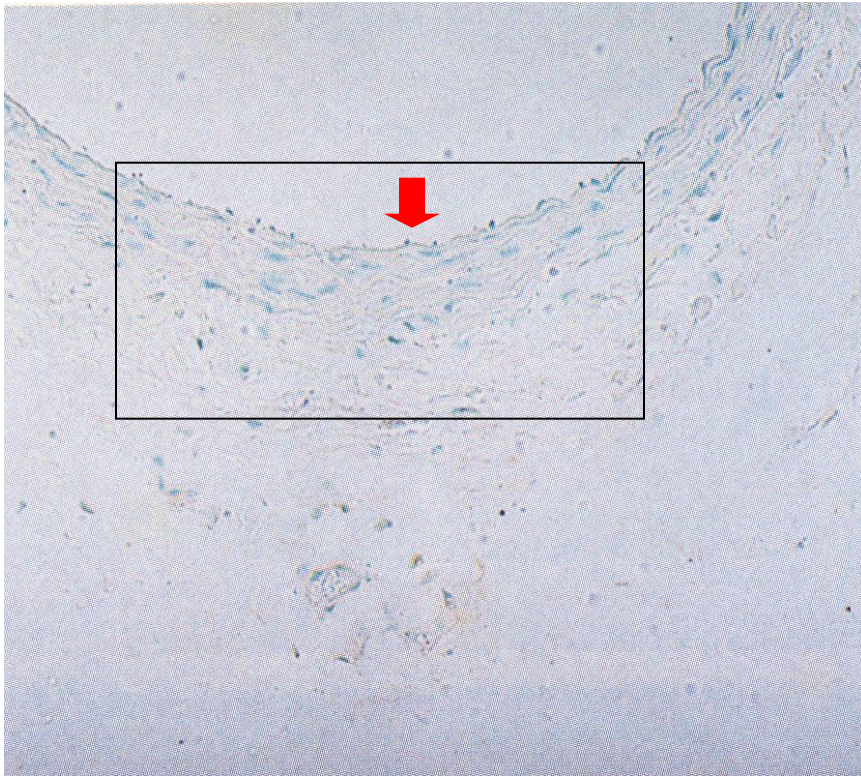
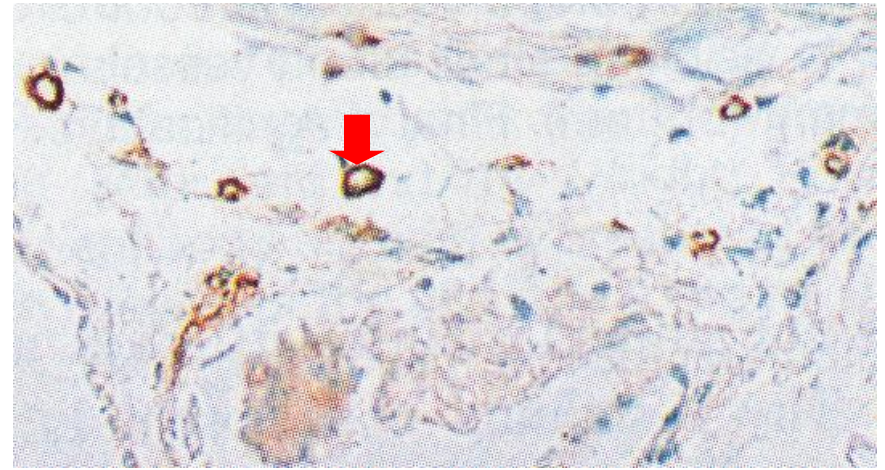
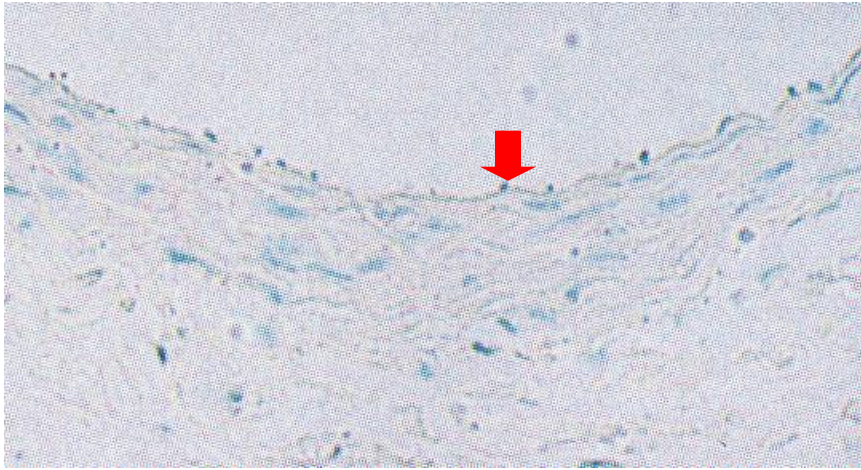
Eye with glioblastoma



Angiogenesis in the pregnant uterus



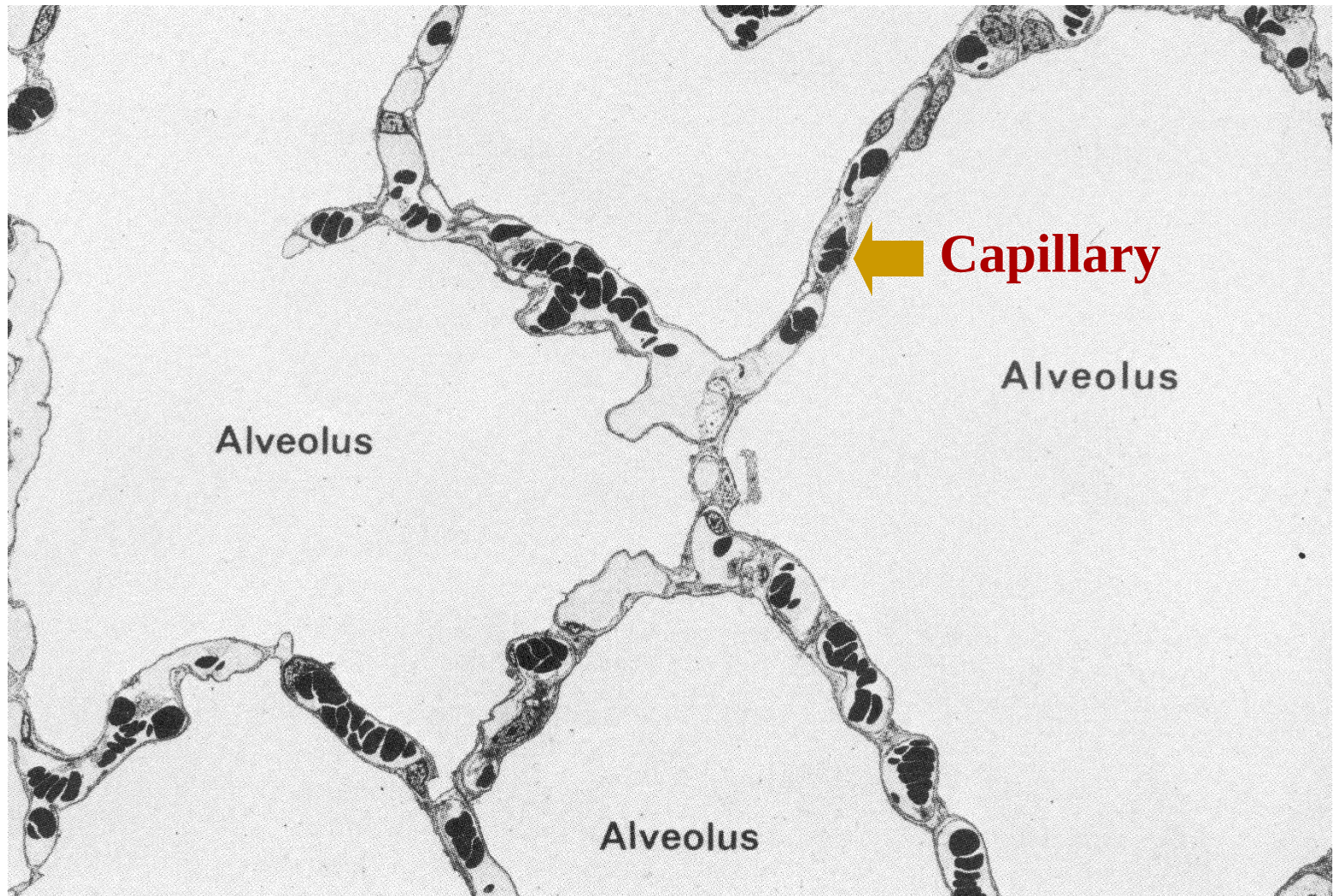
**Is Thy-1 expressed in
the non-proliferation
endothelial cells?**



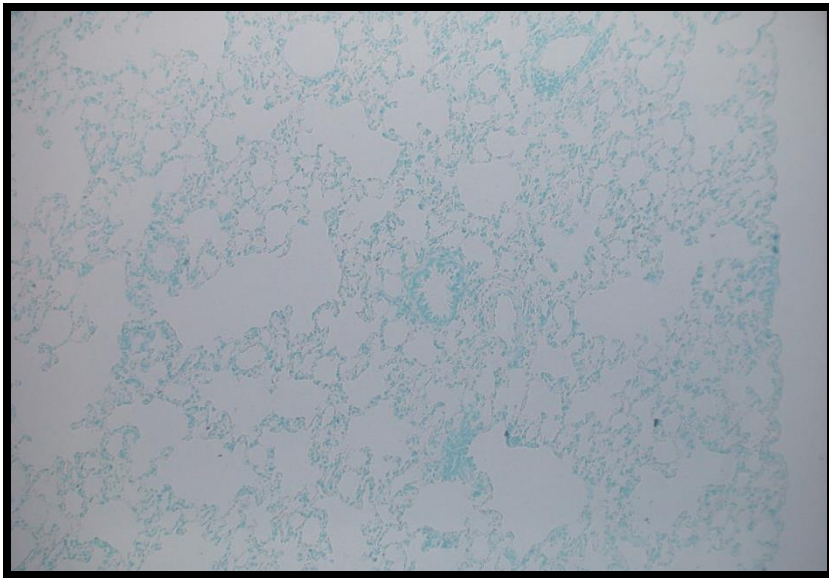
Non-injured carotid artery

Balloon-injured carotid artery

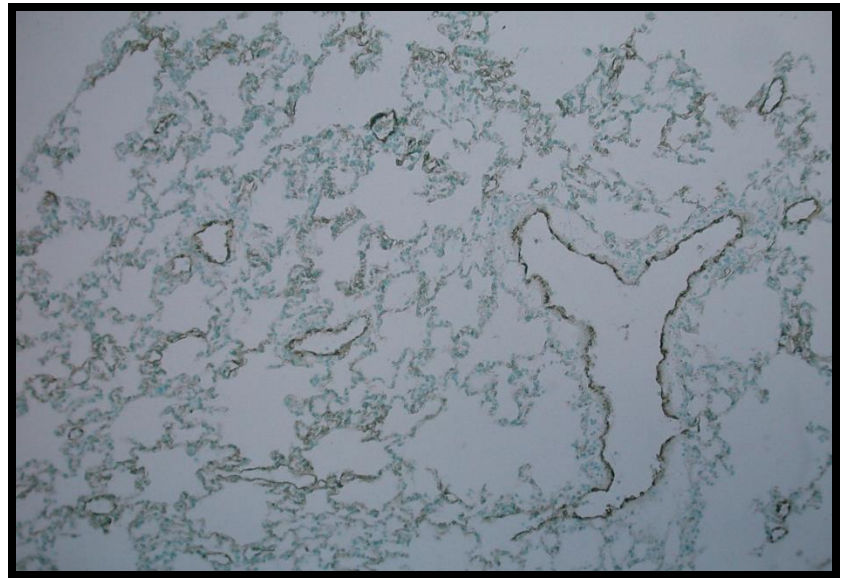
Electron micrograph of alveoli



Rat lung tissues



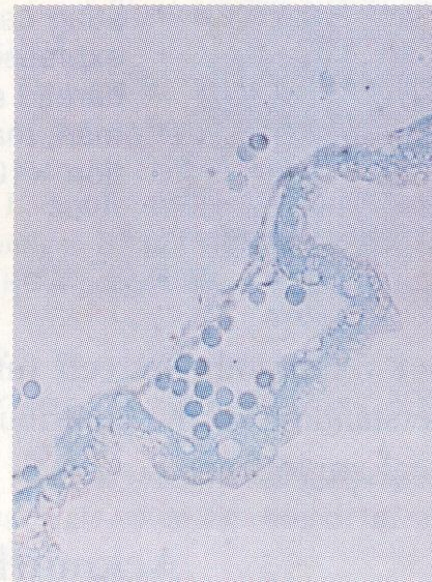
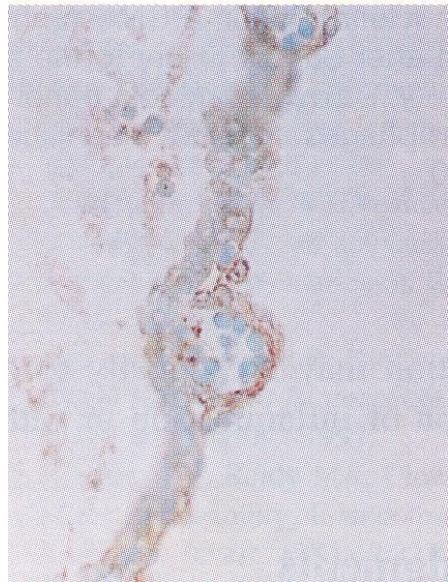
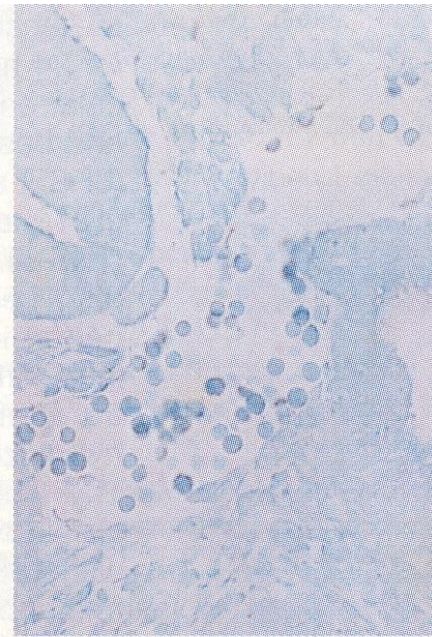
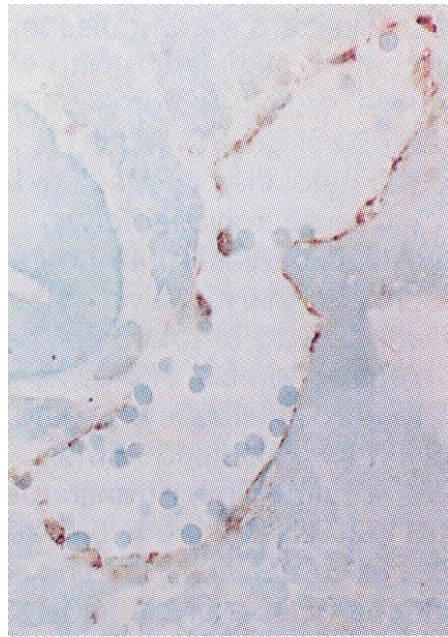
Thy-1



von Willebrand Factor

**Is Thy-1 expressed in
the embryonic vascular
endothelial cells?**

Embryonic tissues



**von Willebrand
Factor**

Thy-1



Circulation Research

Volume 82, Issue 8

May 1998

ARTICLE

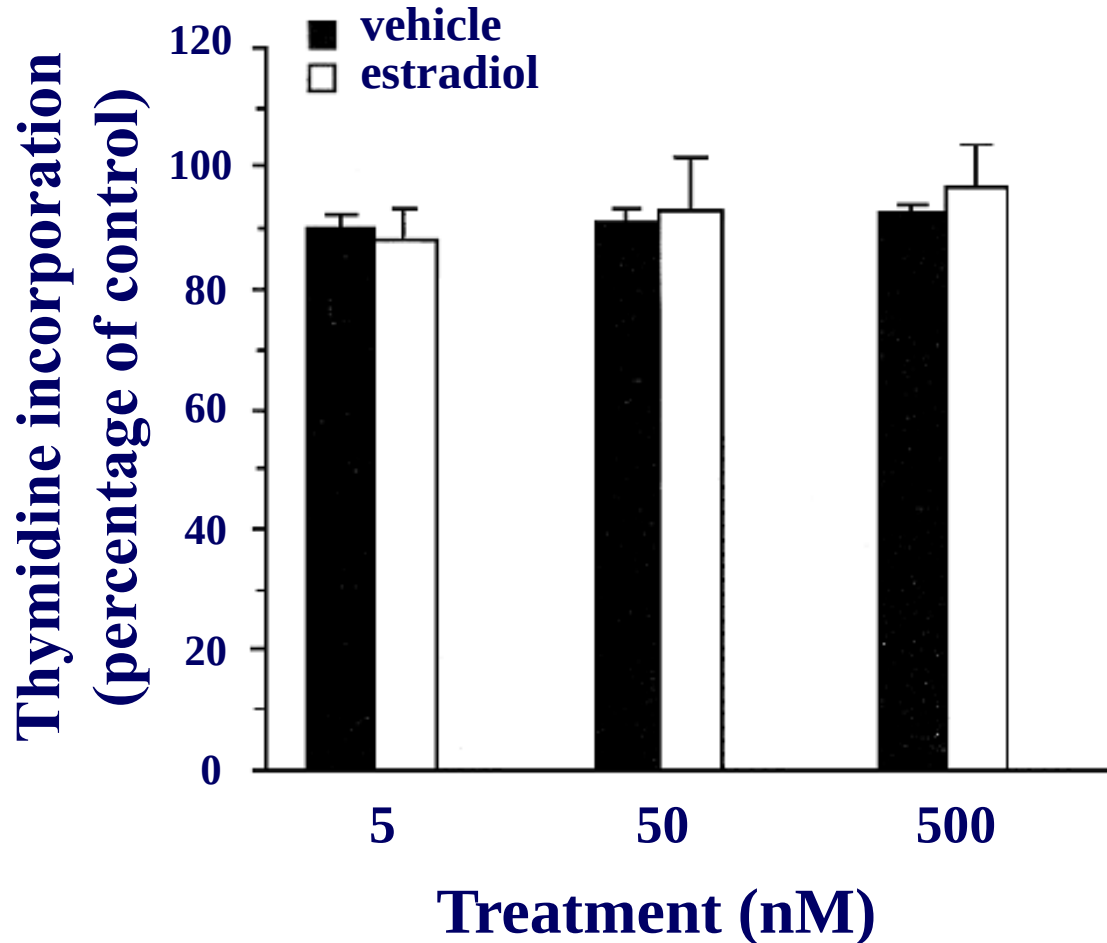
Thy-1, a Novel Marker for Angiogenesis Upregulated by Inflammatory Cytokines

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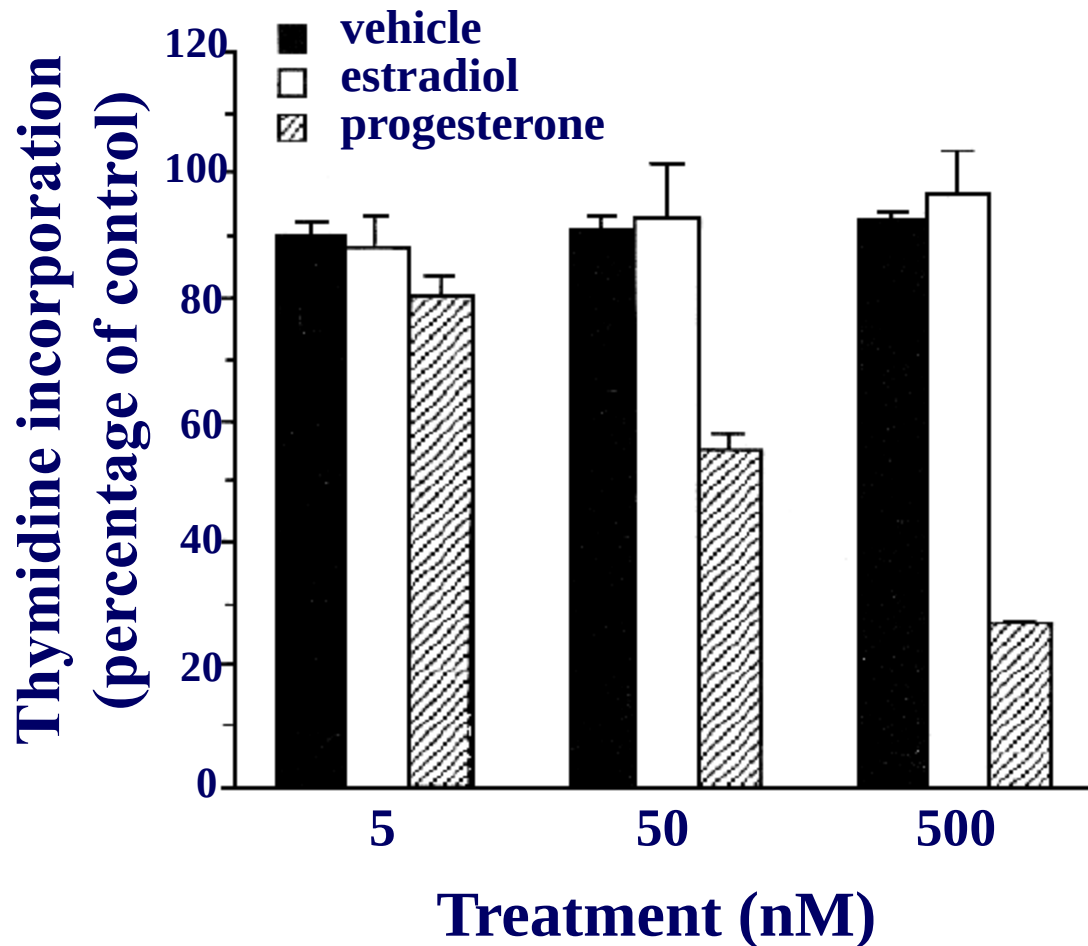
Wen -Sen Lee, Mukesh K. Jain, Burak M. Arkonac,
Dorothy Zhang, Shyh-Yu Shaw, Saori ... [See all authors](#)

**Does estrogen direct inhibit
the vascular smooth muscle
cell proliferation?**

Estradiol does not affect the [3H]thymidine incorporation into RASMC



Concentration-dependent inhibition of [3H]thymidine incorporation into RASMC by progesterone but not estradiol





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ARTICLES

Progesterone inhibits arterial smooth muscle cell proliferation

WEN-SEN LEE^{1,2}, JUSTIN A. HARDER¹, MASAO YOSHIKUMI^{1,2}, MU-EN LEE¹⁻³ & EDGAR HABER^{1,2}

一件新事物的發現都是偶然的：瓦特看見正在沸騰的水壺；牛頓看見蘋果由樹上落下來；倫琴發現一些霧狀感光的底片。而這些人都具備了足夠的知識，能夠由這些稀鬆平常的偶發事件中，發現新的事物。

亞歷山大 佛來明 (Alexander Fleming)

**The two most essential
attributes for the research
worker are a love of science
and an insatiable curiosity**

A love of Science

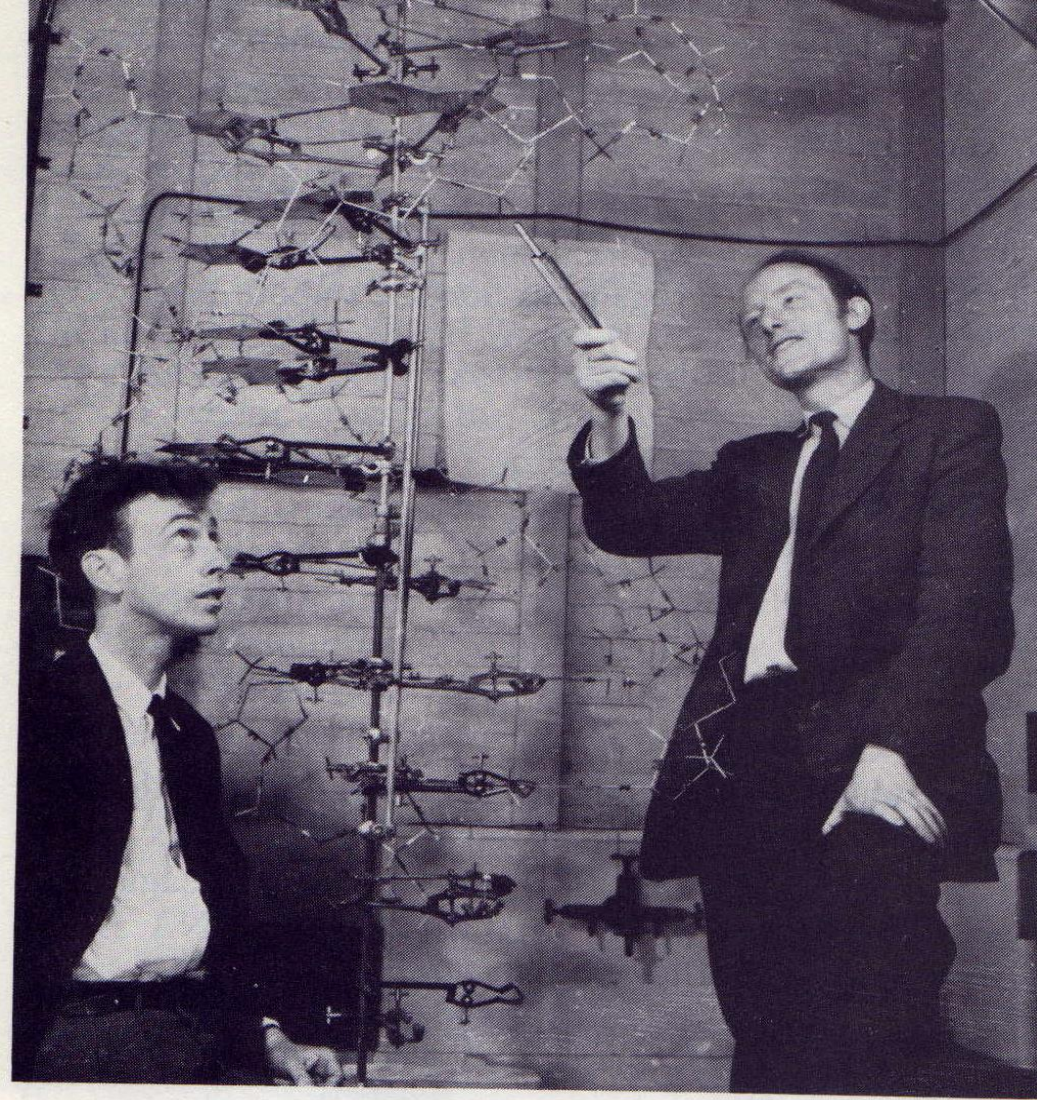


Figure 1-12 James D. Watson (1928–) (left) and Francis H. C. Crick (1916–) (right) ponder and admire the double-helical model of DNA that they constructed in 1952–1953. From J. D. Watson, *The Double Helix*, Atheneum, p. 215, copyright 1968 by J. D. Watson. Photograph by A. C. Barrington Brown.

在這遊戲中有許多遊戲規則，而且要想充分的從中玩出樂趣，你必須先具備相當的知識；但當你從此遊戲中獲得足夠的知識與經驗時，你可以打破這個遊戲規則，並且找到一些別人都沒想到過的東西，這是非常快樂的事。

亞歷山大 佛來明 (Alexander Fleming)



Curiosity

The **curiosity of scientist is usually directed toward seeking an understanding of things or relationships which he notices have no satisfactory explanation.**

It is important to observe everything, and so the observer has to give most of his attention to a selected field, but he should at the same time try to watch out for other things, especially anything odd.

**What is observed depends
on **who** is looking**

**We see only
what we know**

Goethe

One should observe an experiment with an open mind for fear that if we look only for one feature expected in view of a preconceived idea, we will miss other things.

Claude Bernard

Endorphin 的發現



Tenacity

**Let me tell you the secret
that has led me to my goal.
My only strength lies in my
tenacity.**

Pasteur

What makes a great scientist?

**A bright mind is a prerequisite,
but one also needs a spoonful of
good luck.**