Milestones in Immunohistochemistry - Past and Future
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1. “Invention of the pathologist”
- learning to ‘use’ the microscope, 1840s
- the Royal Microscopical Society, London, 1839
- John Hughes Bennett, Edinburgh, Histology, 1842
- Rudolf Virchow, Berlin, “Cellularpathologie”, 1858

“The microscope invented the pathologist” CRT 2002

2. Stains
Biological stains and aniline dyes, 1850 – 1900
Histochemistry, ‘special stains’, 1870s
Biological Stain Commission, 1922, Rochester, NY.

3. Immunofluorescence
Albert Hewett Coons, Charite Krankenhaus in Berlin, 1939
Astrid Fagraeus, Ph D Thesis...

4. Peroxidase conjugates

5. Paraffin section – immunoperoxidase

IMMUNOPEROXIDASE
6. Monoclonal antibodies

Kohler G. Milstein C. Continuous cultures of fused cells secreting antibody of predefined specificity.


The 1984 Nobel Prize in medicine
(Cesar Milstein, George Kohler, Niels Jerne)

7. PAP / ABC - high sensitivity methods

Sternberger LA, Hardy PH Jr, Cuculis JJ, Meyer HG.
The unlabeled antibody enzyme method of immunohistochemistry: preparation and properties of soluble antigen-antibody complex (horseradish peroxidase-antihorseradish peroxidase) and its use in identification of spirochetes.

Hsu SM, Raine L, Fanger H. The use of antiavidin antibody

8. Enzyme digestion - Antigen Retrieval

Mepham, B et al. The use of proteolytic enzymes to improve immunoglobulin staining by the PAP technique. _J Histochem_ 11:345, 1979.


9. Value of IHC in anaplastic tumors


10. Quality – Total Test – Reagents

11. Automation

Beginning around 1990 manufactures began to produce ‘automated’ immunostainers.

The pioneer in this field was Dr David Brigati.

12. Prognostic / predictive markers

Pertschuk LP, Tobin EF, Brigati DJ, Kim DS, Bloom ND, Gaetjens E, Berman PJ, Carter AC, Deppehoen GA.

Immunofluorescent detection of estrogen receptors in breast cancer: Comparison with dextran-coated charcoal and sucrose gradient assays. [Clinical Trial]. Cancer. 1978; 41:907.

IMMUNOPEROXIDASE – paraffin sections.

Jules Elias.
Hector Battifora.
Michael Press.
Craig Allred.

"The testing has to be done right, and it's not."
— D. Craig Allred, M.D., of Baylor College of Medicine


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13. Image analysis / Digitization

Technology advances will drive new
Modes of Anatomic Pathology (and IHC) practice

Computer hardware advances
Computer assisted assisted image analysis
Spectral Imaging
Digitization of whole sections
Broadband transmission/compression technologies
Telepathology
Consolidation of IHC services (Reference Labs)

14. True Quantifiable IHC - an ‘immunoassay’

"protein standards"

"Histoid – Faux Tissues"

"QUELL" Quantitative Elisa-Like Immunohistochemistry/In Situ Hybridization
Inventors: Drs. Craig Allred, Carlos Genty, Sufeng Mao and Syed Mohsin

"QUIRS" Quantifiable Internal Reference Standards

15. Vision 2020

It's a poor sort of memory that only works backwards.

Charles Lutwidge Dodgson.