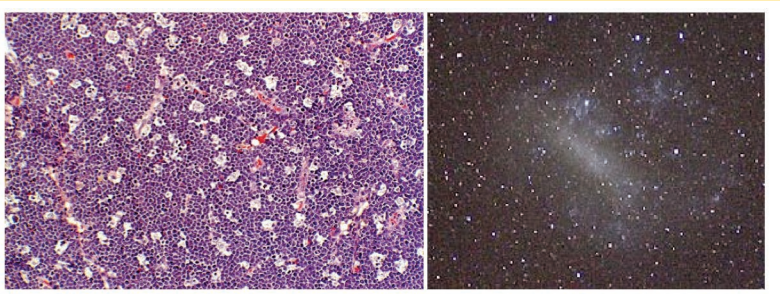
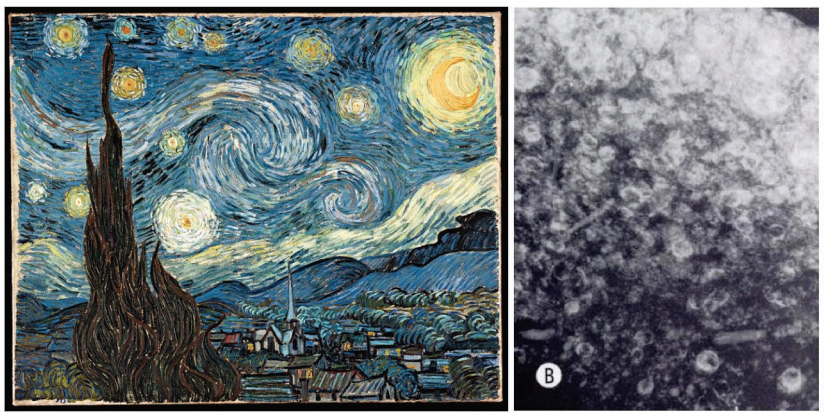
The "Starry Skies" of Astronomical Medicine

If we were to try to boil down "what scientists do" to the most basic and essential elements, one of them would have to be pattern recognition. Genomic ATCGs, mysterious rashes, and the spiraling paths particles trace through cloud chambers are the basic ingredients of the scientific endeavor. The discovery of such visual regularities amongst apparent randomness is not only the basis for developing our systematic and scientific understanding of the world, it also an important engine of analogy.



Stained tissue section of Burkitt's Lymphoma known as a "starry sky" pattern (left), and the starry sky we see above.

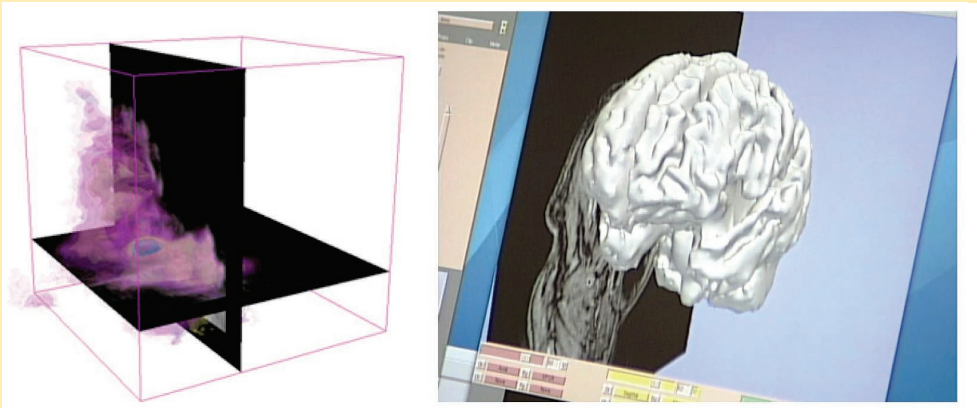
On occasion doctors have described patterns seen in the body as evocative of a summer's sky and its scatter of stars, planets, and the brighter galaxies beyond. Under the microscope, for example, the active proliferation of white cells characteristic of a condition known as Burkitt's Lymphoma is commonly referred to as exhibiting a "starry sky" morphology. Likewise, X-ray images of vessels in traumatized organs have been described by some physicians as reminiscent of the stars in Van Gogh's painting, "Starry Night."



Vincent Van Gogh's "Starry Night" (left) and the "starry night" pattern of tissue damage in a spleen.

As whimsical as these descriptions of our seemingly "celestial body" may be, they also serve to capture important and diagnostic properties of patterns that are recognized better by holistic Gestalt than any single feature alone. Is there anything more, however, to connect the visual practices of medicine and those of astronomy beyond select visual metaphors?

Realizing the commonalities of pattern recognition in their practices, the "Astronomical Medicine" project at Harvard University's Institute for Innovative Computing has begun to take an integrative approach to analysis and exploration of complex data. Astronomers realize they may benefit from the multi-dimensional approaches and software that medical imagers commonly use to look for features in tissue and apply them similarly in their search for star-forming regions in the sky. The hope is that the new hybrid techniques being developed in AstroMed will not only fruitfully explore the meaningful patterns in these two fields, but soon also extend well beyond into other fields such as meteorology, geology, or any set of complex data in search of some deeper visual clarity.



Rendered 3D contours, together with slicing planes, of the star-forming region IC 348 (left), and of the brain (right) at Harvard IIC's "AstroMed" project.

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References and Image Sources

Scatliff, JH , Fisher ON, Guilford WB, McLendonii WW. 1975. The "starry night" splenic angiogram* - Contrast material opacification of the Malpighian body marginal sinus circulation in spleen trauma. *American Journal of Roentgenology*, *125*(1), 91-98.

IIC Astronomical Medicine Project Home: *http://astromed.iic.harvard.edu/*

Eastman Dental Institute at University College, London: *http://www.eastman.ucl.ac.uk/cal/ulcerspath/diseases/burkitts.htm*

The Pathology Guy/ White Cells: *http://www.pathguy.com/lectures/spleen.htm*

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