

The digital learning environment of the future

Teaching the next generation

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Disclosure

Chair, Scientific Advisory Board & equity holder
Decision Simulation, LLC
Licensee of virtual patient simulation technology from the
University of Pittsburgh



we are shaped by what our technology enables us to do, see,
experience and more than anything communicate

Marshall McLuhan (1911-1980)

Overview

- How has technology changed?
- How has it changed us?
- How has learning changed?
- Adapting to change...what's a digital immigrant to do?

DIGITAL LEARNING ENVIRONMENT

distributed | dynamic | detached

The Digital Learning Environment

- Classroom --- Podcasts
- Note taking --- Online notes, laptop, tablet
- Library --- Digital journals
- Anatomy, physiology lab --- Simulation lab
- Bedside teaching --- Standardized pts, virtual pts
- Student union --- Facebook, Twitter

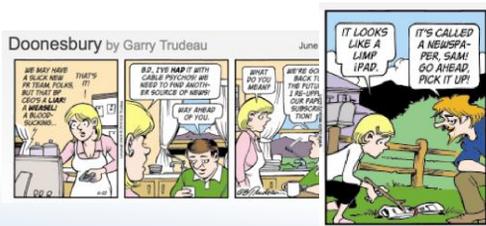
HAS TECH CHANGED STUDENTS?

communication | attitude | perspective

Students and their technology

- 97% own a computer
- 94% own a cell phone
- 56% own a MP3 player
- 76% use instant messaging
- 92% reported multitasking
- 40% use television and 34% the Internet to get most of their news

2007 survey Junco and Mastrodicasa



Millennial students

- self-described optimists and team-players
- largest generation in history...most affluent, the most educated, and the most diverse (36% non-white)
- connected to each other and the world

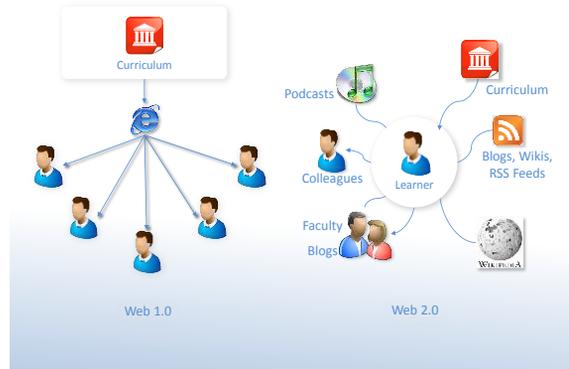
Millennials Rising The Next Great Generation Neil Howe, William Strauss



Has tech changed students?

answers at their fingertips
 always connected to information sources
 many sources to choose from...

- National Library of Medicine
- Digital journals, textbooks
- Video lectures
- Lay publications
- Google, Wikipedia, Blogs, Opinion websites



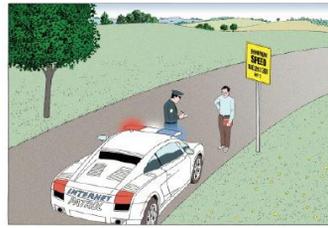
What's not to love?

instant access to information, knowledge, people
 easy and cheap communication
 collaboration, sharing

Is Google Making Us Stupid?

Illustration by Guy Billout

Nicholas Carr



Atlantic Monthly July/Aug 2008

How the learning environment affected?

knowledge a mile wide and an inch deep
 answers rather than understanding
 speed trumps accuracy
 slipping away...deep learning, critical thinking
 knowing the "how," not just the "what"

The "cut & paste" generation

Napster effect
 A culture of "sharing"
 Aggregation websites
 A problem for learning and electronic health records



Janna Quinley Anderson, Elon University and Lee Rainie,
 Pew Research Center Internet & American Life Project July 9, 2010

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Coeliac disease

From Wikipedia, the free encyclopedia
(Redirected from Celiac disease)

Coeliac disease or **celiac disease** is an autoimmune disorder of the small bowel that occurs in genetically predisposed individuals in all age groups after early infancy. Symptoms may include diarrhoea, failure to thrive (in children) and fatigue, but these may be absent and associated symptoms in all other organ systems have been described. It affects approximately 1% of Indo-European populations, though it is significantly underdiagnosed. A growing portion of diagnosis are being made in asymptomatic persons as a result of increasing screening.^[1]

Coeliac disease is caused by a reaction to gliadin, a gluten protein found in wheat (and similar proteins of the tribe Triticeae which includes other cultivars such as barley and rye). Upon exposure to gliadin, the enzyme tissue transglutaminase modifies the protein, and the immune system cross-reacts with the bowel tissue, causing an inflammatory reaction. That leads to flattening of the lining of the small intestine, which interferes with the absorption of nutrients. The only effective treatment is a lifelong gluten-free diet. This condition has several other names, including: **coeliac disease** (with ligatures), **c(e)liac sprue**, **non-tropical sprue**, **endemic sprue**, **gluten enteropathy** or **gluten-sensitive enteropathy**, and **gluten intolerance**. The term coeliac derives from the Greek κοιλία (koilia, abdomen), and was introduced in the 19th century in a translation of what is generally regarded as an ancient Greek description of the disease by Aretaeus of Cappadocia.^[2]

Contents [hide]

- Signs and symptoms
 - Gastrointestinal
 - Malabsorption-related
 - Miscellaneous
 - Rate of other grains
- Diagnosis
 - Blood tests
 - Endoscopy

Coeliac disease
Classification & external resources

Image of small bowel showing coeliac disease characterized by flattening of villi, crypt hyperplasia, and lymphocytic infiltration of crypts.

ICD-9 579.0 Ⓢ
ICD-9 579.0 Ⓢ
OMIM 212750 Ⓢ
DiseasesDB 2922 Ⓢ
MedlinePlus 000233 Ⓢ
eMedicine med/358 Ⓢ
pubmed 2146 Ⓢ
rsdb 652 Ⓢ
MeSH D002446 Ⓢ

UpToDate
ONLINE 15.1

Home

Mark A. Peppercorn, MD
Robert D. Gilze, MD, FRCP

Colorectal cancer surveillance in inflammatory bowel disease

UpToDate performs a continuous review of over 375 journals and other resources. Updates are added as important new information is published. The literature review for version 15.1 is current through December 2006; this topic was last changed on August 24, 2006. The next version of UpToDate (15.2) will be released in June 2007.

INTRODUCTION — Patients with inflammatory bowel disease (IBD) are at increased risk for colorectal cancer [1,3]. The risk is related to the duration and anatomic extent of the disease. The mortality in patients diagnosed with colorectal cancer in the setting of IBD is higher than for sporadic colorectal cancer [2].

Although no large controlled trials have proven that surveillance reduces mortality, surveillance is widely practiced and recommended by the American Gastroenterological Association (see "AGA guideline: Colorectal cancer screening and surveillance"), the American College of Gastroenterology [3], and the American Society for Gastrointestinal Endoscopy (the ASGE recommendations are available online at: www.asge.org).

The epidemiology and pathology of colon cancer in IBD and the evidence supporting a role for cancer surveillance will be reviewed here. Newer techniques for cancer surveillance will also be discussed, although there is insufficient evidence to support their widespread use.

EPIDEMIOLOGY — The risk of colorectal cancer (CRC) is increased in ulcerative colitis (UC) and Crohn's disease (CD). However, much more is known about the risk in UC. (See "Epidemiology and risk factors for colorectal cancer".)

Ulcerative colitis — The risk of CRC in UC depends upon the duration and extent of disease [1,3,10,12]. A population-based study in the United States estimated the risk was significantly increased in those with extensive or pancolitis (standardized incidence ratio [SIR] 2.4, 95% CI 0.6-6.0). In addition, patients with UC complicating primary sclerosing cholangitis (PSC) may be at increased risk for CRC compared to those without PSC. A case control study (in which cases and controls were matched for the extent and duration of disease) found that the risk of CRC was reduced with use of anti-inflammatory agents (including azathioprine, nonsteroidal anti-inflammatory drugs and 5-aminosalicylic acid agents) and by surveillance colonoscopy while it was increased in patients with a history of Crohn's disease.

INTRODUCTION
EPIDEMIOLOGY
-Ulcerative colitis
-Left-sided colitis
-Erositis
-Primary sclerosing cholangitis
-Crohn's disease
PATHOPHYSIOLOGY
PATHOLOGY
-Location
-Dysplasia
-Dysplasia associated lesion or mass
-Inflammatory pseudopolyps
PREDICTIVE VALUE OF DYSPLASIA
SURVEILLANCE AND PROGNOSIS OF CANCER
-Dysplasia surveillance
-New markers
-Chromendoscopy
CHEMOPREVENTION
RECOMMENDATIONS OF MAJOR SOCIETIES
-Ulcerative colitis
-American Gastroenterological Association
-American College of Gastroenterology
-American Society for Gastrointestinal Endoscopy
-British Society of Gastroenterology
-Crohn's disease



TEACHING THE NEXT GENERATION

new roles | new tools | new assessment

New roles for teachers

- teach digital Knowledge skills
- teach skills that convert information into expert action
- use technology to assess comprehension, ability & action and provide feedback
- foster enthusiasm

As a general rule, the most successful man in life is the man who has the **best** information.

Benjamin Disraeli

(not the MOST, THE FASTEST, or THE LATEST information)

DIGITAL KNOWLEDGE SKILLS

find | filter | focus

Comprehension, Ability & Action

active learning | eLearning | simulation

Active Learning

Comprehension

- Ask questions – before, during and after class
- Audience response systems
- Online quizzes - still most popular web technology at Pitt
- Set performance expectations
- Give feedback

eLearning tools...

eLearning research - what works?

eLearning - **interactivity, feedback, Repetition**
Cook, Levinson, et al – JAMA 2008 Sep;10:300(10)

eLearning - **adaptive learning, simulation, feedback**
Cook, Acad Med 2010

Animation - **Procedural/Motor Knowledge**
Ruiz, Cook – Med Educ 2009 Sep;43(9)

Virtual Patients - **Clinical Reasoning**
Cook, Triola, et al – Med Educ 2009 Apr;43(4)



Response (by James Johnston on 10/17/2008 16:17)

Hi John,

This is a little of a hair splitting question. All of the other conditions form the immune complexes in the circulation and the immune complex deposits in the glomerular basement membrane. The immune complexes in Goodpastures form in the membrane. That is the differentiation and I admit it is very picky.

Jamie

(by Amanda on 10/17/2008 12:03)

If I added hypertonic saline solution via IV, would water from the interstitium go into my blood vessels or would sodium travel from my blood vessels into the interstitium?

Also, could you list a couple of relevant clinical situations where you would add hypertonic saline versus hypotonic solution?

Thanks so much!

Response (by James Johnston on 10/17/2008 15:49)

Hi!

Water would move much more quickly than sodium due to the presence of water channels. So, water would go from the interstitium into the blood vessels if the patient received hypertonic saline.

A couple relevant clinical examples!

1) A patient with hyponatremia that developed the abnormality suddenly (over hours) and had symptoms (like seizures). Hypertonic saline would be given to correct the problem quickly.

COMET THE UNIVERSITY OF VERMONT

HOME COURSES LOUNGE RESOURCES SUPPORT FACULTY SYS ADMIN

HOME Help Logout

quick links courses > cardiovascular

Cardiovascular, Respiratory, and Renal Systems (Class of 2010)

Home last visited by [name] on Sun, Oct 14, 2:47 PM

Welcome to CRR

Cardiovascular

- Anatomy review
 - External features of the heart video
 - Internal features of the heart video
- Heart Sounds
 - Auscultation of Heart Sounds (pdf) (com)
 - Auscultation of Heart Murmurs (pdf) (com)
 - Heart sounds website with audio (from up year sound)
 - Awesome animated cardiac cycle/heart sounds: <http://www.khanacademy.org/>
 - Worth seeing: quadricuspid aortic valve
- Pharmacology
 - Sympathetic drugs (xls)
 - Antiarrhythmics
 - drugs that alter cardiac performance (also in excel form alter cardiac performance.xls)
 - vasodilators (also in excel form vasodilators.xls)
 - drugs of the sympathetic nervous system (also in excel form sympathetic drugs.xls)
 - cardiac drugs
 - 3rd another drug summary
- Lectures
 - Arteritis and Aneurysms (in word form arteritis_aneurysms.doc)
- Study Guides
 - week 1 study guide

Human Structure & Function (Class of 2011)

Daily Questions and their some

- Vagal trunk: preganglionic parasympathetic
- Greater splanchnic: preganglionic sympathetic
- Hypoglossal nerve: can find it superior to the greater horns of the hyoid
- Internal laryngeal nerve (sensory to larynx above the vocal cords) runs with the superior laryngeal artery piercing through the thyrohyoid membrane (sensory and Parasymp)
- External laryngeal innervates cricothyroid and inferior pharyngeal constrictor m. (osho)
- Carotid body senses acidity of blood and CO2/O2 content of blood (neural afferents from aortic arch and carotid body)
- Carotid sinus senses blood pressure (CN IX afferent)
- Acoustic baroreceptors less sensitive than carotid
- Thyroid innervated by ansa cervicalis superior from C1 inhibits but hypoglossal n. and inferior is from C2-3
- Ansa cervicalis innervates all infrahyoid m. except cricothyroid m. (which is innervated by Ext Br. Of Superior Laryngeal N. of CN X)
- Thyroid gland does not cover the cricoid cartilage
- When thyroid gland is removed, but carotid of recurrent laryngeal n. and internal/external laryngeal nerves
- Thyroid duct dumps into the join of L. Internal Jugular V. and L. Subclavian V.
- All facial movements are done by CN VII
- Sensation on your face = CN V.
- CN V motor to mass of mastication = temporalis m., masseter m., medial lateral pterygoid m., + 4 more = Ant. Belly Digastric m., mylohyoid m., Tensor Palati m. Tensor Temporalis
- Mental nerve: sensory to chin and lower lip. Branch off of V3 (inferior alveolar n. then mandibular foramen and out mental foramen)
- Internal carotid artery comes through the carotid canal and passes through the cavernous sinus over foramen lacerum
- Parasympathetic postganglionic receptors = nicotinic cholinergic and on the TARGET receptors = muscarinic cholinergic
- ALL ANS postganglionic receptors → nicotinic cholinergic
- Opening eye done via CN III (superior palpebral splanchnic and Superior Tarsal M. (sm. M. = inn by temp fibers from SCO)
- Oligodendrocytes myelinate the optic nerve and olfactory n. but they're brain tissue
- Sympathetic ganglion in the head from T1 & 2 synapses @ Superior cervical ganglion
- Tarsal glands on tarsal plate; secrete oil to keep tears from spilling over eyelids
- preganglionic parasympathetic fibers originate from Nerve Intermedia of CN VII → chorda tympani → synapse in Submandibular ganglion → Lingual N. →

Simulation...

...ability and action

Diagnostic Medicine

When students are engaged, schools succeed. Hello, Kineo.

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Motivation

enthus | engage | inspire

eLearning on an tablet device

Physical connection with the content

Augmented reality

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POSITION QUALITY

HORIZON ANGLE

ELEVATION ANGLE

BEARING 162.7°

eLearning on an tablet device

Physical connection with the content
 Augmented reality
 Assess using clinical challenges
 Provide motivation through scoring, expert feedback
 Motivate and inspire by setting performance goals, variable clinical outcomes and comparing student scores



Time for a change in assessment

Assess understanding
 ...“describe” “outline” “relate”
 ...word problems – need to make a comeback
 Assess higher cognitive skills – synthesis, application, action
 ...clinical scenarios
 ...simulation: standardized pts, virtual pts, physical sims

Conclusions...

Students are different – shaped by their technology
 access to information
 sharing with peers
 Learning is still hard – Teaching is different
 teach skills to fine, filter and focus digital knowledge
 expertise is a long road from knowledge at your fingertips
 assess understanding, ability and action
 inspire excellence in the next generation

thankYou

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