Transmission of infectious agents

The route of transmission is the way in which the '*infectious agent (etiologic agent, EA)* reaches a susceptible individual. It is in a certain way excluded from its source, it must have resistance to the external environment and mechanisms for entering a receptive organism. There are both EAs with a single specific transmission route and EAs with multiple possible transmission routes.

Direct transmission

Some EAs are transmitted by ``direct transmission *during close contact susceptible individual with source of infection.*

- **Transmission by contact** - by touching, kissing, sexual intercourse, biting, scratching - e.g. agents of infectious mononucleosis, AIDS, rabies, [[cat scratch disease|cat scratch disease]].
- **Droplet transmission** - EA is transmitted in droplets from the HDC (or aerosol) source to the HDC of a susceptible individual - e.g. acute respiratory infection (influenza, parainfluenza, etc.).
- **Perinatal transmission** - infection of a susceptible individual during passage through the birth canal - e.g. streptococcus sk. B, *E. coli*, *N. gonorrhoeae*.

Indirect transmission

- **Transmission by indirect contact** - EA reaches a susceptible individual through a contaminated object (usually an item of daily use).
- '*Transmission by inoculation* - EA enters a susceptible individual through a contaminated tool, device (injections, surgical procedures, invasive examination techniques) or is contained in administered biological products (blood, blood products, blood plasma, transplants) − eg HBV, HCV, CMV, HIV, nosocomial EA.
- **Airborne transmission** - infected droplets from HDC can, in addition to direct infection, contaminate objects, dry and form contaminated dust, remain in the air (below 100 µm) for varying periods of time and spread relatively far from the source - e.g. respiratory infections (acute respiratory diseases, exanthematic diseases, pertussis, diphtheria, pulmonary TB etc.), skin infections (staphylococcus), alimentary (oxyuriasis), zoonoses (tularemia, pulmonary form of the plague, anthrax).
- **Alimentary transmission** - after ingestion of a contaminated vehicle, EA enters a susceptible individual via the GIT.
  - "Water" – from drinking or utility water for drinking, washing, bathing, washing dishes or preparing cold dishes. When water is contaminated, explosive epidemics occur depending on the number of people supplied with the incriminated water and the duration of EA presence in the water (this depends on the properties of the water). E.g. typhoid, paratyphoid, cholera, hepatitis A, HAV, poliomyelitis anterior acuta, leptospirosis are spread through water.
  - "Food" - also the cause of explosive epidemics, EAs often multiply and produce toxins in them. The source of infection can be food of animal origin (contaminated primarily by EA from the animal, or secondarily during processing), but also vegetables fertilized with feces and unpeeled fruit.
  - *Milk* - may be contaminated primarily by zoonoses (bovine TB, Q fever, tick-borne encephalitis, brucellosis).
  - "Eggs" can be a source of salmonella, which is effectively destroyed by boiling for 8-10 min.
  - *Meat products* may contain salmonella, trichinella, toxoplasma or *Clostridium botulinum*.

- **Transmissive transmission** - by means of ***vectors'*** *(carriers), especially by different species of arthropods.*
  - *Biological* - the vector plays an active role in the life of the EA (reproduction, part of the cycle); especially blood-sucking arthropods − e.g. malaria, trypanosomiasis, leishmaniasis, arboviruses, tularemia, rickettsiosis, plague, relapsing typhus, Q-fever.
  - *Mechanical* - a vector contaminated with its feces rubs against food (salmonella, shigella, enteroviruses).
  - These infections often occur in certain "natural foci", i.e. in localities characterized by: animals (reservoir), carriers (vector), flora and fauna (biocenosis), maintenance without the presence of man (man is an accidental element in the foci contagion, usually a blind link, but can sometimes carry the contagion into a city and cause an urban form of the contagion with a natural focus).

- **Transplacental transmission** - from mother to fetus - e.g. rubella, HIV, CMV, toxoplasma, *Treponema pallidum*.
- **Soil transmission** - e.g. tetanus, anaerobic clostridia, mycoses (the source is always human or animal).

Factors influencing the spread of diseases

The process of the spread of infection is further complexly influenced by various factors.

1. **Natural factors** - climate, geographical location, altitude, amount of precipitation, humidity - affect the biocenosis, which in turn affects the survival of the vectors, reservoir or intermediate hosts; it mostly concerns contagion with a natural focus. Climatic conditions are related to the seasonal occurrence of infections.
2. **Social and economic factors (socio-economic f.)** - hygiene and health care; health awareness of the population, which is closely related to the level of personal hygiene itself. Unfavorable consequences arise

from collectivization, thanks to transport the easier distribution of diseases and the possible introduction of exotic diseases; communal meals; industrial food production.

Links

Related Articles

- Contagion Spread Process
- Source of infection
- A susceptible organism in the process of spreading disease
- Bloodborne Diseases

References

- GEIZEROVÁ, H, et al. *Epidemiologie – vybrané kapitoly pro seminární a praktická cvičení.* 1. edition. Praha : Karolinum, 1995. ISBN 80-7184-179-X.